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No. 26

CONNERS TRANSPORTATION PROJECT.

DETAILS OF THE LARGE UNDERTAKING THAT IS INVOLVED IN GRANTS TO AMERICAN CAPITALISTS FOR GRAIN ELEVATORS AND OTHER FREIGHT TERMINALS AT MONTREAL.

At a meeting that is now being held in Chicago plans are under way for the financing of one of the largest transportation projects ever undertaken on the great lakes. In the name of W. J. Conners valuable grants of sites for the erection of grain elevators and warehouses in the harbor of Montreal have finally been fully secured, not only from the harbor commissioners of Montreal, but also from the higher government authorities in Canada having jurisdiction over the harbor. In all the discussion that has attended negotiations for the Montreal terminal property, and which related also to the probability of developing a very large export trade in grain through the new Canadian canals of the St. Lawrence, the names of W. J. Conners of Buffalo, and Harvey D. Goulder of Cleveland, the latter counsel in the matter, have alone appeared prominent. It was not to be expected, however, that an undertaking of this kind was being urged by a couple of Americans in Canada without certain assurances from other capitalists on this side regarding the large amount of money that will be required for the Canadian company that must at once take over the Montreal grants from the so-called Conners syndicate. Even yet no new names are given out, but it is quite certain that the new company will include among its stockholders men connected with large grain interests of Chicago and the northwest.

The capital required will certainly not be less than \$5,000,000, as the Montreal contract calls for an expenditure at that port alone of not less than \$3,700,000 for elevators and warehouses, the elevators (three of them) to be of 9,000,000 bushels combined capacity. Of course not all this is to be provided immediately, but the operations of the company will involve the employment of a large fleet of vessels of the special canal type, for the construction of some of which arrangements must be made at once. It is understood that the immediate arrangements on this score contemplate the construction of at least two steamers of canal size at the plant of the Bertram Engine Works Co., Toronto, and the construction in England of four steamers and four tow barges, the latter to be of full canal size and to be similar to the regulation lake tow barge except as to the reduced dimensions.

The scope of this project is best explained by a summary of the contract under which the Montreal grants are to be secured. The Montreal harbor commission is to grant to W. J. Conners, or rather to the company that is now being formed, three pieces of dock property on which to construct grain elevators and large warehouses for the handling of miscellaneous freight. It is enough to say with reference to this dock property that it is among the choicest in the harbor of Montreal and affords ample space for the transfer of millions of tons of freight. On one of these sites, which is now ready for occupancy, the syndicate is to construct at once a modern steel or combination elevator of 3,000,000 bushels capacity and first-class modern warehouses, to cost together not less than \$1,000,000. It is already planned by the syndicate to have this elevator and the warehouses cost \$1,150,000, the warehouses to be of the three-story kind. As regards the second site, the syndicate binds itself to erect, when the condition of improvements now under way will permit, similar first-class elevator or elevators and warehouses of capacity of not less than 3,000,000 bushels and to cost not less than \$1,350,000. On the third site the space to be allotted (this is a part of the harbor not yet improved) is to be sufficient for at least one large elevator and warehouse and here too the expenditure of the syndicate is to be at least \$1,350,000. The project also includes the provision of elevator and warehouse facilities at Port Colborne on Lake Erie, which is the western terminal of the Welland canal, and the deepening of the harbor at that point, so that large lake vessels, unsuited to canal trade, will transfer grain and other freight there, to be carried down to Montreal by the smaller type of craft, these latter engaging in either through traffic from Chicago and Duluth to Montreal, or simply in the Port Colborne-Montreal trade as conditions may warrant.

In return for these grants it is agreed by Mr. Conners and his associates that in the first season after a stated depth of the water is provided at Port Colborne, such depth to be 18 or 20 feet, on a sufficient area to allow large lake vessels to transship their cargo, there will be transported to Montreal and handled through the elevators and other facilities of the syndicate, at least 25,000,000 bushels of wheat, or the equivalent in weight of other freight, and in each season thereafter 35,000,000 bushels of wheat or the equivalent in weight of other freight.

Other clauses in the contract deal with certain safeguards required by the Montreal harbor commission in event of the project failing; with the purchase of the property by the commission if satisfactory terms for renewal cannot be agreed upon at the end of the forty-year period, and with a bond in the sum of \$50,000,000 that is to be provided by the syndicate immediately upon the execution of the agreement.

A rumor to the effect that Harvey D. Goulder of Cleveland, is about to give up his very active law practice has been current for some time past, but there is nothing in it. Mr. Goulder will very probably hold an important position with the large corporation that is to take over from W. J. Conners the Montreal harbor grants and he is now trying more than ever to so arrange his business that he will have less to do than in the past with the trial of cases—work that has kept him away from Cleveland during the greater part of the past year—but aside from this there is nothing in the report of his giving up law practice.

EIGHTEEN AND A HALF MILLIONS.

IRON ORE SHIPMENTS FROM THE LAKE SUPERIOR REGION DURING 1899 WILL AGGREGATE THAT NUMBER OF GROSS TONS—COMPLETE REPORTS SHOW WATER SHIPMENTS OF 17,901,358 TONS, TO WHICH WILL BE ADDED ABOUT HALF A MILLION TONS OF RAIL SHIPMENTS—AN INCREASE OF ABOUT 32 PER CENT OVER 1898.

An output of 18,500,000 gross tons of iron ore is to be credited to the Lake Superior region for the year 1899. Official returns from dock managers at all the shipping ports show a total movement by water of 17,901,358 tons, to which will be added 500,000 to 600,000 tons of all-rail shipments. The great increase in lake commerce during the past year will be understood when it is noted that the ore movement alone is 32 per cent in excess of 1898. The total movement, lake and rail, in 1898 was 14,024,673 tons; in 1897, 12,469,638 tons, and in 1896, 9,934,828 tons, so that there has been almost a doubling up of shipments in four years.

Full 2,500,000 tons of this 1899 increase is from the state of Minnesota; from what are known as the new ranges, Vermillion and Mesabi. For a great number of years the port of Escanaba, which is an outlet for ore from both of the original ranges, Marquette and Menominee, has held, almost without interruption, the first place in the shipping column, but this year Two Harbors (Minn.) takes first place with shipments of 3,973,733 tons. Escanaba is a close second with a total of 3,720,218 tons and then comes Duluth, the other Minnesota port, with 3,509,965 tons. Marquette and Ashland are about even, with shipments of 2,733,596 and 2,703,447 tons respectively. A full summary of the output for five years past follows:

OUTPUT OF IRON ORE FROM ALL MINES OF THE LAKE SUPERIOR ORE REGION 1895 TO 1899 INCLUSIVE.

PORTS.	1899	1898	1897	1896	1895
Escanaba.....	3,720,218	2,803,513	2,302,121	2,321,931	2,860,172
Marquette.....	2,733,596	2,245,965	1,945,519	1,564,813	1,079,485
Ashland.....	2,703,447	2,391,088	2,067,637	1,566,236	2,350,219
Two Harbors.....	3,973,733	2,843,246	2,651,465	1,813,992	2,118,156
Gladstone.....	381,457	335,955	341,014	290,887	109,211
Superior.....	878,942	550,403	531,825	167,245	117,884
Duluth.....	3,509,965	2,635,262	2,376,464	1,988,932	1,598,783
Total by lake.....	17,901,358	13,655,432	12,215,645	9,644,036	10,283,910
Total by rail.....		369,241	253,993	290,792	195,127
Total shipments.....		14,024,673	12,469,638	9,934,828	10,429,037

Gains made by the different ports over 1898 are as follows: Two Harbors, 1,280,487 tons; Escanaba, 916,705; Duluth, 874,703; Marquette, 487,631; Superior, 328,539; Ashland, 312,359; Gladstone, 45,504.

The famous Norrie mine, or rather the Norrie group, will not be alone this year as a property of the million-ton kind. Two Mesabi mines, the Mountain Iron and the Fayal, exceeded the million-ton mark, and it will be found also, when the statement of shipments by mines is published after the first of the year, that there are still two others on the Mesabi, the Adams and Mahoning, that are probably slated for a million tons each in 1900. The output of the Adams this year foots up 720,000 tons and that of the Mahoning 740,000 tons. The output of the Chandler mine exceeds 800,000 tons and the Chapin has made the greatest record in its history, approaching the million-ton mark.

NEW ORE DOCK AT DULUTH.

Mr. H. L. Dresser, chief engineer of the Duluth, Missabe & Northern Railway Co., has been kind enough to furnish the Review with particulars regarding the new ore dock to be erected by the D., M. & N. Co. at Duluth. The dock is to be built on plans similar in most respects to those of the present docks, but larger and higher. Increase in the size of lake vessels, more especially in the height above the water line, has necessitated raising the floor of pockets and the heel of spout far above the level of the old structures on the lakes, to allow the ore to run freely in the spouts.

The Duluth, Missabe & Northern dock No. 3, now in course of construction, is 66½ feet in height and 62 feet in width, the heel of the spout being 40 feet above the water line. At present there are being constructed 192 pockets with a capacity of 210 tons each. The additional width permits the placing of a track along the center of the dock for storing empty cars and minimizing the work of switch engines. The dock proper will require 6,500,000 feet of sawed timber and 4,780 pieces of piling in its construction. The trestle approach to the dock will be a double track structure 2,700 feet in length, requiring upward of 2,000,000 feet of sawed timber, 1,474 pieces of piling and 400 linear feet of steel trestle, the latter being placed over street crossings and tracks of other railroads. The Barnett-Record Co. of Minneapolis, Minn., has the contract for building the dock proper and the timber portion of the approach. The entire structure is to be completed and ready for use by May 1, 1900.

William Lamb & Co. of Norfolk, Va., a well-known shipping firm, has announced its intention to establish, under the title United States Towing & Transportation Co., a steamship line between Norfolk and Cuban and Porto Rican ports. Lamb & Co. are well known as the Norfolk agents for Pocahontas coal.

IMPORTANT CASE IN ADMIRALTY.

AN OPINION FROM THE UNITED STATES SUPREME COURT INVOLVING ANSWERS TO SEVERAL IMPORTANT POINTS—FINAL DISPOSITION OF THE CONEMAUGH-NEW YORK COLLISION CASE, WHICH HAS BEEN IN COURT NINE YEARS.

A copy of the opinion of the United States supreme court in the Conemaugh-New York collision case, which has been in the courts for nine years, is at hand. The collision between these two steamers, which resulted in this long struggle at law, occurred between 7 and 8 o'clock on the evening of Oct. 21, 1891, on the Canadian side of the Detroit river, a short distance below Sandwich, Ont., and about opposite Smith's coal dock on the American side. Testimony in the case has several times been reviewed in these columns, and the principal interest now is attached to the opinion of the United States supreme court on the several points that admitted of the case being considered in that court. In the district court both vessels were held at fault. On re-argument in the same court the New York was found solely at fault and the Conemaugh exonerated. Then in the circuit court of appeals the Conemaugh was held solely at fault and the New York exonerated. Now the United States supreme court disposes of the case by holding both vessels at fault, as was done in the beginning. The case was advanced to the supreme court on a writ of certiorari, in which the points raised were as follows: First, whether the great lakes are lakes and inland waters of the United States so as to be excluded from the operation of the international regulations of 1885. On this point the court said that the regulations referred to do not apply to the great lakes, although it is well known that in the application of certain other laws the lakes are regarded as high seas. A second point was whether the court would take judicial notice of the Canadian sailing regulations or would require technical proof, and on this score the answer was in the affirmative; the Canadian regulations would be recognized. Still another point was the question of the rules of the United States steamboat inspection service applying in Canadian waters. The answer was that these rules apply, at least so far as the maneuvers were in American waters. A fourth point was whether, under the starboard hand rule, when the privileged vessel is obliged to alter her course to avoid another moving vessel, she is so far privileged that she can resume her former course without regard to the presence of the burdened vessel, that is the one having her on her own starboard hand. On this point the answer of the court was that the privileged vessel is not so far privileged.

In holding that the international regulations of 1885 do not apply to the great lakes, the court notes that in the repealing clause the exception of vessels navigating "the harbors, lakes and inland waters of the United States" excludes the great lakes from the operation of the law. "If the word 'lakes' was not intended to include the great lakes," says the court, "it is difficult to see the object of congress in making use of that word since nearly all the other navigable lakes, except Lake Champlain, are located within the limits of a single state, and no act was necessary to exempt them, as the power of congress does not extend to the purely internal or infra-territorial commerce of the country." This left applicable to the case the regulations of 1864, section 4233 of the revised statutes. The court further holds that "in so far at least as the maneuvers of the respective vessels took place in American waters," the supervising inspectors' rules are applicable; that the power of the supervising inspectors to adopt rules is limited to vessels "navigating any waters of the United States which are common highways of commerce, or open to general or competitive navigation."

As to the Canadian sailing regulations, the court holds that the Canadian statute of 1886, excepting certain immaterial local regulations, being a "literal copy of the congressional act of 1885," the court will take judicial notice of them as laws of the sea and of general obligations. For observing the Canadian statute in this particular case, a further reason, having application only to the particular case, is assigned by the court.

The court then takes up the case of the Conemaugh. The Conemaugh had blown to the New York two separate signals of two blasts each without receiving any reply. A third signal of two blasts was then blown without reply of any character from the New York. The court says: "The duty of the Conemaugh at this juncture was plain. She should have stopped her engines after the second signal, and, if necessary to bring her to a complete standstill, have reversed them. Nothing is better settled than that, if a steamer be approaching another vessel which has disregarded her signals, or whose position or movements are uncertain, she is bound to stop until her course be ascertained with certainty. There was peculiar necessity for such action in this case. These vessels were about to meet upon crossing courses, and to pass each other in the narrowest part of the channel. The Conemaugh had three times signaled her wish to take the Canadian side, and pass starboard to starboard. The New York had three times neglected to give her assent to this arrangement. The Conemaugh had construed her failure to reply as an acquiescence in her own signals. The New York might have construed such failure as a refusal to acquiesce. In such a case it was clearly incumbent upon the Conemaugh to stop until the mystery of her silence was explained, and in failing so to do she was guilty of fault."

The court held that the fault of the Conemaugh appears the more flagrant from the fact that the two steamers were crossing, with the obligation on the Conemaugh to keep out of the way; this to be done, under the inspectors' rules, by porting. "But, irrespective of this rule, prudent seamanship ordinarily requires that the obligated vessel shall take a course which, if the preferred vessel perform her own duty, will certainly avoid a collision, viz., port and go astern. If, upon the other hand, she elects to starboard and cross the bows of the other vessel, she incurs the manifest danger of not passing the point of intersection before the preferred vessel strikes her, and is justly considered as assuming the responsibility for the success of her maneuver. Of course, there may be such conduct on the part of the favored vessel as would show that she was alone guilty of fault, but the greater safety of porting is so manifest that the circumstances must be quite exceptional to justify

a different course. The failure of the Conemaugh's maneuver in this case only emphasizes her original fault in failing to come to a standstill when her two first signals to the New York were disregarded."

In considering the case of the New York, after speaking of the Burlington tow, then in the process of rounding to, the court quotes from her answer as follows: "The New York blew a passing signal of one blast, at the same time checking her engine and reducing her speed to about four miles an hour, and then porting her helm so as to pass under the stern of the last barge. When the New York had arrived at a point abreast of the last barge in tow, a signal of two whistles was heard, but being unable to see any vessel, and noticing only a white light close on the Canadian bank of the river, the signal of two blasts was not answered, as it seemed to be intended for some other vessel, the New York being then close to the Canadian bank, and there not being room enough for any vessel to safely pass between her and the bank." And further the court says: "If there was no other evidence in the case than these allegations, and the uncontradicted testimony of the Conemaugh that she blew three signals to the New York, none of which were answered, it is sufficient to show the latter to have been guilty of a grievous fault. The night was clear, and there appears to have been no difficulty in seeing the white and colored lights of the Burlington and her tow, and should have been none in seeing the lights of the Conemaugh."

This presumption of fault the court holds to be greatly strengthened by the failure of the New York to introduce any testimony. A few very interesting concluding paragraphs in the opinion are as follows:

"The only excuse of the New York for her omission is that she was the preferred vessel within the nineteenth American and sixteenth Canadian rule, and that by the twenty-third American and twenty-second Canadian rule, it was her duty to keep her course. But the fact, that a steamer is entitled to hold her course does not excuse her from inattention to signals, from answering where an answer is required, or from adopting such precautions as may be necessary to prevent a collision, in case there be a distinct indication that the obligated steamer is about to fail in her duty. As was said in the case of *The Sunnyside* (91 U. S. 208, 222): 'Cases arise in navigation where a stubborn adherence to a general rule is a culpable fault, for the reason that every navigator ought to know that rules of navigation are ordained not to promote collisions, but to save life and property by preventing such disasters.' See also *The Delaware* (161 U. S. 459); *The Maria Martin* (12 Wall. 47). Both the Canadian and American codes provide that in construing and obeying these rules, due regard must be had to all dangers of navigation and to any special circumstance which may exist in any particular case, rendering a departure from them necessary in order to avoid immediate danger. There is another rule pertinent in this connection, namely, rule twenty-one American, and article eighteen Canadian, that every vessel when approaching another vessel so as to involve risk of collision, shall slacken her speed, or, if necessary, stop and reverse. That the obligation to observe this rule attached to the New York under the peculiar circumstances of this case is entirely clear. Her attention had been called to the fact that a steamer was coming down the river between the rear barge and the Canadian bank. The channel was narrow, and the descending vessel had signified her intention to starboard her helm and pass the New York to the left. The New York avers in her answer that there was not room enough for any vessel to safely pass between her and the Canadian bank, but notwithstanding this, she kept her course toward that bank, and was thus constantly narrowing the channel through which the Conemaugh signified her intention of passing. She averred that her speed in passing the tow was about four miles an hour, but the district judge was of opinion that she maintained double that speed until the vessels came together. However this may be, her failure to answer the whistles of the Conemaugh or to stop and reverse, after her white light was seen, was wholly inexcusable, and, under the particular circumstances, cannot be justified by her general duty as a favored vessel to keep her course or by anything that was said by this court in *The Britannia* (153 U. S. 130). The master of a preferred steamer cannot, by blindly adhering to his course, atone for the neglect of other precautions.

"We do not wish to say that the New York was under any obligation to assent to the proposed arrangement, although in starboarding and passing close to the two rear barges she did in fact take the exact course she would have taken if she had assented. If she had blown one whistle she would have indicated her intention of pursuing her course under her port wheel as the privileged vessel; while if she had blown two whistles she would have starboarded, as she did starboard, and keep as near the rear barges as she safely could. What we do decide is that the duty to answer a signal is as imperative as the duty to give one. Not only does the second rule of the supervising inspectors require of crossing steamers that 'signals by whistles shall be given and answered promptly,' but ordinary prudence demands that an obligated steamer proposing by whistle to deviate from the customary course shall receive an immediate reply, that her wheel may be at once put to starboard or port, as the exigencies of the case may require. A delay of even a few seconds may seriously embarrass her as to the intention of the preferred vessel. This is now made obligatory upon vessels navigating the great lakes by the act of Feb. 8, 1895, (28 Stat. 645,) the twenty-third rule of which declares that 'every steam vessel receiving a signal from another shall promptly respond with the same signal, or as provided in rule twenty-six.' If the New York had promptly answered the Conemaugh's signals, probably no collision would have occurred.

"The comments we have made upon the failure of the Conemaugh to stop and reverse are equally pertinent to the case of the New York. If she did not hear the whistles of the Conemaugh, she ought to have heard them; but irrespective of this, there was enough to apprise her of her danger in pursuing her course with unabated speed. She knew that she was about to meet in a narrow channel a steam vessel coming down upon her with the added speed given by a current of two to two and a half miles an hour. She heard her final signal of two blasts as she was passing the last barge, and should have known that if she continued her course a collision would be inevitable, and yet she did not stop or re-

verse. Her conduct was inexcusable. The lesson that steam vessels must stop their engines in the presence of danger, or even of anticipated danger, is a hard one to learn, but the failure to do so has been the cause of the condemnation of so many vessels that it would seem that these repeated admonitions must ultimately have some effect. We cannot impress upon the masters of steam vessels too insistently the necessity of caution in passing or crossing the course of other vessels in constricted channels.

"But, assuming the theory of the New York to be true, and that as the preferred vessel she was bound to keep her course, under rule nineteen, the fulfillment of her duty in that regard undoubtedly added to the embarrassments of the Conemaugh. It is averred in her answer that after making the white light of the Conemaugh she continued on her course so as to go around close to the last barge, and when abreast of her quarter starboarded, so as to go close under her stern. For this change in her course she relies upon the case of the John L. Hasbrouck (33 U. S. 405,) in which we held that the obligation of a privileged vessel to keep her course does not forbid such necessary variations in her course as will enable her to avoid immediate danger arising from natural obstructions to navigation. In that case a sailing vessel descending the Hudson river at West Point was held to have been excused in changing her course to round a projection at that place, but in this case the New York had still from 500 to 800 feet before her before reaching the Canadian bank. Her original porting was undoubtedly to avoid the tow, but there seems to have been no immediate necessity for her starboarding to pass so close to the rear barges, though we should not condemn her upon this ground. See discussion of this in the *Velocity* (L. R. 3 P. C. 44); the *Banshee* (6 Asp. M. L. C. 221). While the presence of the tow un-

FROM THE CAPTAIN OF THE PARKS FOSTER.

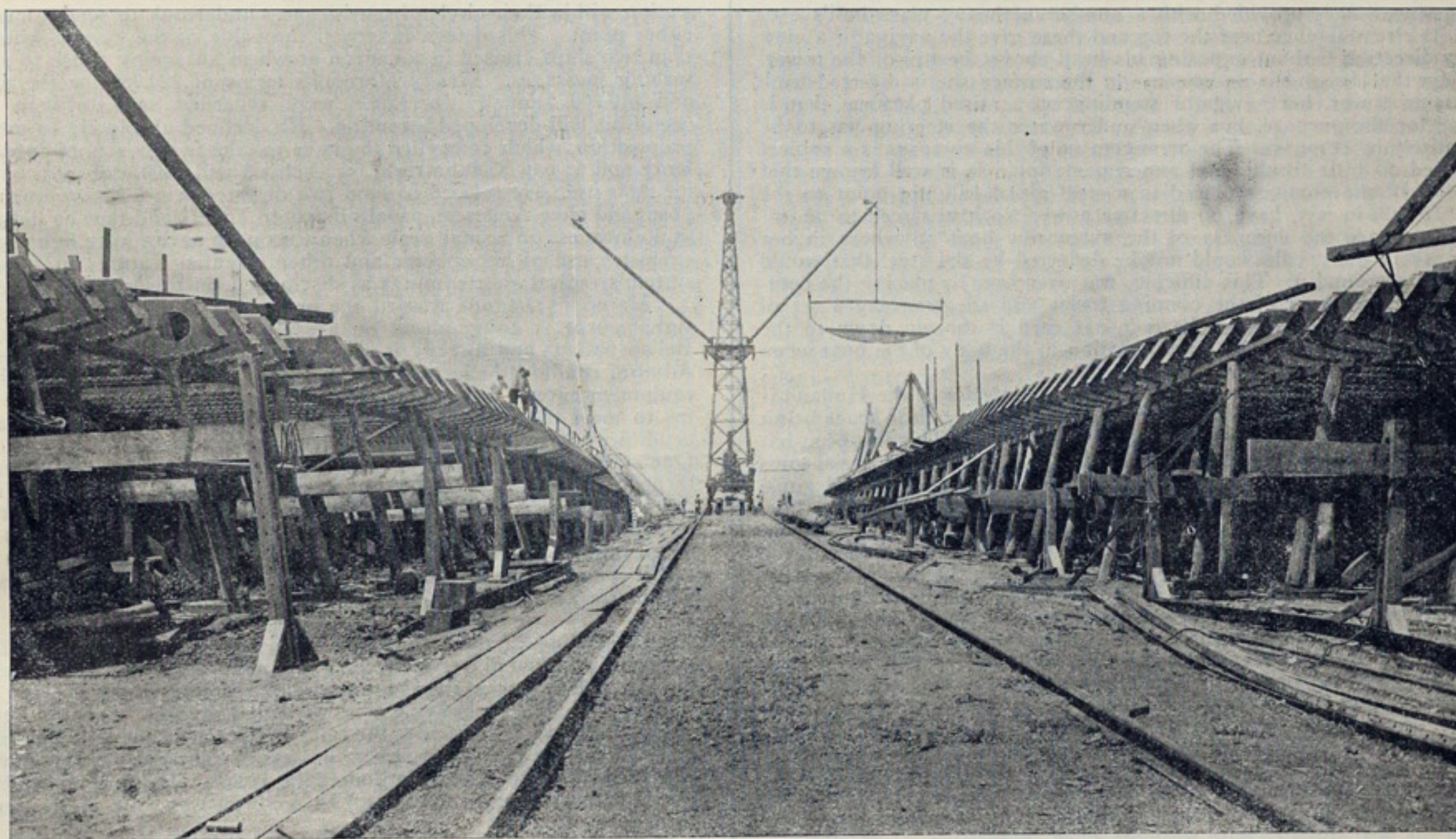
Editor Marine Review:—Replying to the article in the Marine Review of Dec. 14 regarding the steamer Parks Foster and the steamer Pratt and consort Athens: The article is erroneous in four particulars. First, the Parks Foster was not at anchor at the time the Pratt and Athens passed her. She had been at anchor, but had gotten under way and had regulation signal lights burning, and ought not to have been mistaken for a steamer at anchor. Second, the Pratt and Athens passed the Foster. The Foster did not pass nor attempt to pass the Pratt and Athens. Third, the Parks Foster went over out of the dredged channel into natural water of Little Mud lake and stopped and gave them (the tow) the entire channel in which to pass. Fourth, there was no damage done while these vessels were passing the Parks Foster. The Parks Foster did not blow a one-blast signal to the Pratt on that date in Little Mud lake; therefore the Pratt had no opportunity to reply with a check or danger signal.

E. J. BURKE,
Cleveland, Dec. 23, 1899.

Master Steamer Parks Foster.

NEW TYPE OF DERRICK.

There is presented herewith the first illustration of a novel type of crane just installed at the ship yard of the Maryland Steel Co., Sparrow's Point, Md. This device has long since passed the experimental stage. Thorough tests have proven its practicability as a saver of time and expense. The plan of operation, to put the idea in a nutshell, is to raise the ship plates from the ground to the exact position desired on the side of the vessel, instead of lowering them from above as it done at Newport News, at the works of the Cramps and at other ship yards where traveling



NEW TYPE OF DERRICK FOR HANDLING SHIP BUILDING MATERIAL AT THE WORKS OF THE MARYLAND STEEL CO., SPARROW'S POINT, MD.

doubtedly rendered it necessary for the New York to port, and thus to become a crossing vessel, and a preferred vessel under rule nineteen, there was no obstruction to her continuing under her port wheel until she had approached so near the Canadian bank as to make it necessary to turn.

"The theory of the New York is an inconsistent one—as inconsistent as that of Conemaugh. She argues that she was under no obligation to assent to the signals of the Conemaugh by starboarding her helm. But she did in fact starboard her helm, and now insists that she did this in discharge of her duty as a preferred vessel to resume her course after she had cleared the obstruction. But without deciding that she was in fault for starboarding, her conduct in so doing adds another to the many reasons why she should have indicated to the descending steamer her proposed course. If the Conemaugh recognized the fact that she were the preferred vessel and bound to hold her course, it would naturally confuse her to see the New York suddenly starboarding, exhibit both her colored lights, and point directly toward her, as she must have done. The probable explanation of the course of the New York is that the officer of her deck was so intent upon watching the lights of the barges that he omitted to notice the lights of the Conemaugh until the vessels had approached so near that a collision became extremely probable. The fact that her lights were seen and her signals heard by the crews of the Burlington and her barges and by persons standing upon the coal dock, at a greater distance from the Conemaugh than was the New York, only indicates more clearly that her lookout was either insufficient or incompetent. If he actually saw her and reported her to the officers of the deck, the responsibility is only shifted from the lookout to them."

A crew of one hundred seamen of the American navy will be sent to England to bring over the new cruiser Albany, recently completed at the Elswick yard.

cantilevers propelled by electricity or steam are employed. The "locomotive derrick," which is the most prominent feature of the new apparatus, was designed and built at the Maryland Steel Co.'s works, and its development is due chiefly to the ingenuity of Manager Wilson of the marine department and Engineer H. A. Magoun. As regards its operation on standard gauge track, the derrick corresponds to the regulation type of locomotive crane, utilized in all ship yards for the handling of material, but instead of being mounted on the ordinary type of flat car, the apparatus in this case is operated from a steel derrick, which permits of a load of ten tons or even more being raised to a height of from 60 to 75 feet. The plan of the Maryland company officials is to install one of these derricks between each pair of ways in the ship yard, just as is done with the cantilevers. The hoisting apparatus for this device was furnished by the Lidgerwood Manufacturing Co. of New York city.

Henry H. Febel of New York city has patented an invention whereby, it is claimed, a pair of propeller shafts may be driven at high speed from a single driving shaft traveling at a lower speed, all being mounted in the same horizontal plane, the propeller shafts being mounted divergently to admit of the use of extra large screws. The essential features of the mechanism are a driving shaft carrying on its end a heavy disk, the slightly conical surface of which is provided with a series of radial grooves, arranged like the spikes of a wheel. The two shafts carrying the propeller screws are connected with this disk by two carriers, one on each side of the centre of the disk, the outer ends of the shaft being thrown apart. These carriers are close to the disk and the rollers on which they are mounted stand within and are actuated by the slots or grooves in it. It is claimed that by this arrangement a motion is imparted to the carriers in the same direction, but at twice the speed of the driving shaft, which may be actuated by any suitable power, such as a gas, electric or steam engine.

SUBMARINE WARFARE.

WASHINGTON IS STIRRED UP ON THE SUBJECT BY THE VISIT OF THE HOLLAND BOAT—INTEREST IN THE COMING TRIALS OF THE VESSEL—GOVERNMENT WILL DEVELOP ITS OWN APPARATUS FOR WIRELESS TELEGRAPHY.

WASHINGTON OFFICE MARINE REVIEW, 1345 PENNSYLVANIA AVE.,
WASHINGTON, Dec. 27, 1899.

Sometime during the present week the inspection test of the submarine torpedo boat Holland will take place over a course in the channel of the Potomac river abreast Fort Washington. This course was selected by Lieut. Maxwell of the president's yacht Sylph and Mr. F. A. Verdu of the Holland Submarine Torpedo Boat Co., and it offers every facility for tests of both the submarine and the surface characteristic of the boat. Since the arrival of the Holland at the navy yard crowds have thronged the wharf at which she lies in the hope of getting a good view of the vessel, whose invention promises to revolutionize naval warfare, but no one is allowed to board.

The exterior of this strange craft seems, however, to furnish a spectacle that sight seers deem worthy of attention, for certainly an opportunity has never before been given them of viewing anything more out of the ordinary. Only about 40 feet of the boat's 54 feet of length is visible above the surface and as she lies at the dock little is to be seen except the flagstaffs and the cylindrical structure which serves both as a conning tower and as a means of ingress and egress. This miniature hatchway is of bronze 1 inch thick and 18 inches in diameter and extends well above the plane of the false deck, which is the only portion of the boat visible above the surface. In order that this raised entrance may also serve as a conning tower, it is provided with a number of heavy glass bull's eyes around its circumference near the top and these give the navigator a view in every direction without exposing his head above the top of the tower.

When the Holland is under way on the surface she is directed from the conning tower, her navigator standing on a raised platform that is provided for the purpose, but when under water the steering has to be done entirely by compass. The arrangement of this compass is a subject that caused no little trouble and experimentation. It is well known that the needle of the compass placed in a steel globe will not point to the north. It will, in fact, have no directive power, so it was seen to be impossible to place the compass of the submarine boat anywhere in her interior where the needle would not be deflected by the steel that would completely surround it. This difficulty was overcome by placing the compass in the upper part of the conning tower and so arranging a set of mirrors that the reflection of the compass card is thrown down to the position of the navigator who takes a station in the body of the boat when she is submerged.

One of the first things to be noted about the interior of the Holland is the little room that is not filled with machinery, the only clear space being just forward of the ladder leading from the upper deck. This has been left open to permit the loading and operating of the 8 and 18-inch aerial guns and the 18-inch torpedo tube, the breech of the larger of the aerial guns, which is fired through an opening in the bow 3 feet below the water line, being directly above that of the torpedo tube. One torpedo is carried in the tube and compartments are provided for two more in the open space at the breech, several more being stowed in carriers in the bow of the boat. Whitehead torpedoes are to be used, and owing to the fact of their being discharged below water they attain a speed and a velocity impossible in those fired from above the surface. The Holland's tube is capable of propelling a torpedo a distance of about a mile, while the Whitehead torpedo itself has a range of about half a mile at a velocity of 30 knots an hour. Another advantage of the submarine tubes is that the torpedo is not subjected to the deflection caused by striking the surface of the water. Smokeless powder and compressed air are the means used for discharging projectiles, the air used for this purpose being stored in two tanks. Along the sides of the boat are six other tanks containing about 30 cubic feet of air at a pressure of 2,000 pounds to the square inch, the contents of these tanks keeping the boat supplied with fresh air when submerged.

The principal machinery of the Holland is in the after part of the boat, the engine that controls the pneumatic steering gear being just abaft of the turret and secured to the lower side of the upper deck, while the engine that controls the diving apparatus is near it and in a similar position. This diving engine is provided with means for keeping the boat at a desired depth—a pendulum device for maintaining a horizontal position and an automatic device for bringing her from an inclined or diving position at a predetermined depth. Still further aft is the engine room, the center of which is occupied by the gasoline engine by means of which the boat is propelled when on the surface. Nearly all of the remaining engine space is taken up by three dynamos, the larger of which is of 45 horse power. This engine furnishes power for propelling the boat when submerged. One dynamo of 10 horse power is used for compressing air, and another of 1½ horse power is used for lighting and for providing ventilation. The speed of the boat when propelled by electricity is controlled by a lever similar to the one used on electric cars and this gives the engineer perfect control of the power to be applied.

As a safeguard in case of accident to the dynamos the Holland is provided with storage batteries capable of producing a power of nearly 170 volts, these being stored just above the keel. The submerged tanks are arranged along the sides and bottom of the boat and are filled or emptied by the movement of one or two levers at which a man is kept stationed. Near the position occupied by the navigator is a pressure gauge which indicates the depth to which the boat has descended and whether or not she is still sinking. On his port side are wheels governing the steering gear and on the starboard side are other wheels which control the driving machinery. When he desires to ascend to the surface the helmsman can do so by simply operating the diving rudders or more quickly by emptying the storage tanks.

The Holland is nearly cylindrical in cross section and is 11 feet in diameter. She draws 8½ feet of water, weighs 63 tons and has a displacement of 74 tons. The sides of the boat are steel plates from ¾ to ½ inch in thickness and these are supported by circular steel frames arranged

about a foot apart. Above the real body is a false deck, which forms a flat superstructure upon which it is possible to walk. The vessel has an ordinary three-bladed propeller at the stern, and besides the directing rudder, which is in the usual place, there are two horizontal diving rudders near it.

Should the test be a success there is no doubt that the government will purchase both the boat and the right to the invention. Mr. E. B. Frost, president of the Holland company, in speaking of the Holland said: "The Holland will revolutionize naval warfare. This vessel can sink below the surface of the water in eighteen seconds, fully a minute before a gunner could even get his sights trained. Heretofore no submarine boat has ever been constructed that could sink within fifteen minutes. Therefore this craft is almost safe from shells. Then this vessel carries enough air to allow the crew to remain under water for twenty-four hours, so that a cruiser would have a hard time locating her. I think she is one of the most wonderful inventions of a century of progress."

GOVERNMENT TO DEVELOP ITS OWN WIRELESS TELEGRAPHY.

Rear Admiral Bradford has asked authority from the navy department to establish a bureau at the naval training station at Newport for the development of a naval system of wireless telegraphy. It is proposed to detail several officers, having high electrical knowledge, at this station and to furnish facilities for study and experiment in the belief that something better than Marconi's apparatus may be devised. The project to secure the Marconi system for the navy has been practically abandoned. In the first place its range was found to be exceedingly limited, especially when vessels were rolling in a seaway and their topmasts were varied in height above the water. Then there was the insuperable objection of interference, two stations being unable to hold intelligent communication when a third station within their circle of sensitiveness undertook to send a message to either point. This defect destroyed the value of the system where more than two ships cruised in squadron or where an enemy chose to send disturbing messages. Finally Marconi's terms of \$20,000 for the first year and \$10,000 annually thereafter were regarded as exorbitant for the use of his half-developed invention. He declined absolutely to modify his proposition, which compelled the navy to take twenty sets of apparatus or more and to pay \$500 outright for each set and \$500 each year as royalty for their use. He refused to send two or three sets for experimental purposes and gave American naval officers to understand that he did not care to do business on a small scale when European navies were fighting for the exclusive use of his coherer and other essential features in spite of the system's radical shortcomings as discovered on this side of the Atlantic.

Marconi's attitude toward the army was scarcely different and the signal corps is going ahead on a system of its own which avoids the Italian patents and already is said to be producing better results. Rear Admiral Bradford believes that some of the electrical experts of the naval equipment bureau, if the opportunity is given to them, will produce apparatus to meet the peculiar conditions of the navy without appreciable expenditure and in all probability the experiments he desires will be ordered. One station will be located at the training station and the other at the torpedo school on islands about a mile apart, and as progress is made other stations can be set up at various points in Newport harbor, where torpedo boats are always available for experiments with vessels in motion or for miniature fleet evolutions. Several forms of apparatus from American inventors have already been submitted for test and doubtless others will be received when the work is actually started.

In sending in the nomination of George W. Melville, chief of the bureau of steam engineering, to be a rear admiral the day before the senate took its holiday recess it was the desire of Secretary Long that the promotion should come to Melville as a Christmas present. Senator Pettigrew, however, objected, and under the rules of the senate the nomination had to go over for one day. There being no session the next day the nomination was therefore forced over until after the recess. There is no doubt whatever but that the nomination will be confirmed as soon as the senate re-assembles.

Commander Emery thus wires the navy department regarding the trial off Boston harbor of the training ship Chesapeake, the first sailing vessel built for the navy in more than forty years: "Trial completed and Chesapeake returned to navy yard. Under way Monday in light airs under all sail. Under way Tuesday under all plain sail to top sails, in strong breeze with fresh squalls both days. Vessel maneuvered well today. Her steady heel under topsails by the wind was ten degrees, increasing to sixteen in fresh squalls." The navy officials regard the performance as most satisfactory.

Satisfaction is felt in official circles over the reports received by Rear Admiral Hichborn, chief of the bureau of construction, showing the complete stability of the protected cruiser Albany. It is expected that her official preliminary trial will occur next month in English waters.

The navy department has been informed that the Bath Iron Works proposes to clean the bottom of the torpedo boat Craven, which, on her official preliminary trial, made only 29.5 knots when her contract requirements call for 30.5 knots. It is expected that the pitch of the screw will also be changed, which may necessitate a restandardization.

Not one officer of high rank in the navy will retire for age during the coming year. Usually from one to four rear admirals are retired annually, but the highest ranking officer who will give up active service under the age requirement in 1900 is W. C. Gibson, a captain. Two former engineers will go out. They are Capts. P. A. Rearick and J. Lowe. The first rear admiral to retire will be Rear Admiral McNair, superintendent of the naval academy, who will give up active service Jan. 13, 1901, and later in the same year Admiral Schley will retire.

An advance in wages that will affect nearly 14,000 men has been announced by the Carnegie Steel Co. the past week. Common labor is advanced to \$1.50 a day.

FAILURE OF THE COLUMBIAN IRON WORKS.

An unpleasant announcement of the past week in ship building circles was the failure of the Columbian Iron Wks. & Dry Dock Co. of Baltimore. The petition for the appointment of a receiver was filed by Henry A. Parr, who is one of the company's largest creditors and who is said to be interested to the extent of \$300,000. It is not unlikely that the action was in some degree influenced by the failure, a few days previously, of Christian Devries, who was largely interested in the Columbian company and who was an endorser of the company's paper. The reason given for asking for a receiver was to prevent a scramble on the part of the creditors when payment of maturing obligations is denied and to secure them from loss. The petition states that there is due the company from the government large sums for work now under way and that when these become available they will serve to pay in large part all claims. Consent is given to the appointment of a receiver in the hope that the company will get time to complete its contracts and also that means may be devised by which the necessary capital can be procured for closing up the work. Mr. Parr was appointed receiver and only a nominal bond of \$100,000 was filed, the sum by no means representing the assets.

The obligations of the company amount, so far as can be learned, to about \$400,000, most of which is due Baltimore banks in promissory notes. The paper is endorsed by Henry A. Parr, William T. Malster, mayor of Baltimore and president of the Columbian company, and Christian Devries. There is also \$75,000 owing to Philadelphia banks. Other obligations amount to \$3,300. The Columbian company has only recently completed the revenue cutter Seminole. The submarine torpedo boat Plunger is almost completed and one of the new torpedo boats is well in hand.

Since the above was placed in type, Mr. Henry A. Parr, receiver of the Columbian Iron Works & Dry Dock Co., has been authorized by the court to continue for sixty days such work at the yard of the company as may in his judgment be advisable for the purpose of completing contracts already partly performed. For this purpose Mr. Parr is authorized to borrow \$30,000 from time to time on his obligations as receiver. These obligations are to be a first lien on all the property and assets of the company. As explained, there is a large amount of work nearing completion in the yard, including the revenue cutter Seminole and the tug Savage, the latter building for the Consolidation Coal Co. Both these vessels are so near completion that they can be turned out in a week or ten days, and the hull of the torpedo boat Tingey is also well along toward completion. By finishing up the work in hand it is claimed the company will earn about \$100,000, which would be entirely lost should the work be discontinued and the contracts abandoned. Mr. Parr is instructed to notify all creditors of the company to file their claims within ninety days.

REPRESENTATIVES FROM THE PACIFIC FAVOR SHIPPING BILL.

In answer to an inquiry as to what in his opinion congress would do with regard to the shipping bill, which Senator Frye has introduced in the senate and Mr. Payne in the house, Senator MacBride of Oregon said:

"I have no idea what the final result will be, but it seems to me that the needs of our merchant marine are very pressing, and the interests of the country demand that something should be done. There is in my section of the country a universal demand that congress legislate so as to encourage and stimulate our American shipping, but there is considerable variance of opinion as to the best methods of accomplishing the result. In the last congress I voted to bring the shipping bill out of the committee on commerce, although all its provisions did not meet with my approval. Speaking for myself, I would say that if a bill could be framed under whose provisions an export bounty could be paid on American products shipped abroad in American bottoms, I believe our merchant marine would be vastly benefited. The whole question is, however, a problem for congress to work out and I have no doubt that the senate and house will arrive at a just conclusion. As a general proposition the encouragement of our merchant marine is popular and just."

Representative W. L. Jones of Washington state, a member of the committee on merchant marine, speaking on the subject said: "In my state we are decidedly interested in the shipping question. There is a great dearth of ships on the Pacific coast, and the time is come when there should be better service to the Asiatic coast. The vessels that ply now in the Pacific are not at all sufficient to accommodate the traffic. Hundreds of tons of merchandise are constantly waiting transportation across the ocean. It is surprising to me that any one should oppose legislation on this subject so important to every national interest."

At noon Saturday there will be launched at the Wyandotte ship yard of the Detroit Ship Building Co. a river steamer, the Tashmoo, which is intended for excursion service between Detroit and Port Huron, and which is patterned somewhat after the best type of Hudson river boat. It is the intention of the Review to shortly illustrate and describe in full both hull and engines of this steamer. The triple expansion engines, which will be the largest in use on the great lakes, will receive steam from seven Scotch boilers, at a working pressure of 170 pounds. The boilers have 11-foot shells and are of a new design. Engines, which will be of the inclined type, connected direct to the paddle shaft, will have cylinders of 33, 51 and 82 inches diameter and 6 feet stroke. The monster paddles of the Tashmoo will have nine buckets to each wheel, 48 inches wide by 12 feet 6 inches long. The wheels are of a new design to insure strength and perfect automatic motion. The wheel frames are 24 feet from center line to the pinion holes of the paddles, and the new construction is said to practically make an accident to the paddle buckets from contact with the river banks an impossibility.

A New York wrecking company will in all probability attempt to float the steamer City of Jacksonville, which has been ashore near Portsmouth, N. C., for several months. The vessel, despite her long sojourn fully 2,500 feet from deep water, has not sustained any damage worth mentioning.

DEVELOPMENT OF CARDIFF DRY DOCKS.

Mr. Daniel T. Phillips, United States consul at Cardiff, Wales, has just forwarded to this country a report upon the new dry dock at that port, which is in substance as follows:

"Cardiff has long been known as the first port in the world for outward-bound tonnage. It is also one of the foremost ports for ship repairing. In no other do we find so many up-to-date dry docks; in no other do we find greater volume and value of business. The development in the dry docks at Cardiff is now watched with profound interest by shareholders, ship owners and merchants generally. The management of the Bute Dry Dock, Ship Building & Engineering Co. has introduced an entirely new principle in connection with their enterprise. Owing to the increasing length of steamers, the company, large as its dock is, has often found it impossible to deal with two large ships at the same time. It has frequently happened that a ship requiring extensive repairs to her bottom has monopolized the whole of the dock, though actually only about half its length. This statement may seem contradictory, but the explanation makes it simple enough. The ship may run past the caisson by a few feet, and thus the lower portion of the dock is rendered useless, because another vessel could not be let in without flooding the one which is being repaired. Thus, the dock may be robbed of nearly half its capacity. When such conditions prevail, work has to be handed over to a rival dock. It is obvious that the remedy for this trouble is to provide two docks."

"Here two serious considerations arise—the expenditure involved and the space required. The directors of the Bute dry docks have found it impossible to eke out sufficient land on their estate to make a new dock. This difficulty has perplexed the company more than the question of cost. Mr. Good has mitigated the difficulty by planning something like a half dock, leading off the dock they now have. Stripped of all technical verbiage, the plan is this: Excavations are being made on the office side of the present dock to half its depth, and the bottom and sides concreted and stoned. The distance between the blocks on the bottom of the present dock and the bottom of the half dock will be about 16 feet. The entrance to the present dock is from the Roath basin, consequently the level of water is always about the same. A ship requiring extensive repairs to her bottom will be brought into the present dock in the customary way; water will then be pumped in to a height sufficient to haul her broadside on to the blocks placed in the half dock. At such time there would be 13 feet 6 inches of water over the blocks in the half dock, and as the mean draught of an ordinary cargo boat on an even keel is about 11 feet, it will be clearly seen that there will be 2 feet and over to spare. The water can be reduced by the opening of sluices. A ship thus placed on the blocks of the half dock would remain dry while vessels passed in and out of the present dock for painting or other work. The new wing, of course, can be used for any purpose the present dock is put to, and will undoubtedly prevent it from being obstructed in any way. The successful completion of this important undertaking will mark a new era in the history of dry-dock extension under straightened circumstances. This new dock will be 400 feet long by 75 feet wide. The company anticipates that the new addition will increase its accommodation and earning power by 50 per cent. The estimated cost is \$121,600. The contractor has agreed to complete the work in six months."

A BUFFALO SHIP BUILDING CONTRACT.

A very handsome contract has just been awarded to Hingston & Son, ship builders of Buffalo, N. Y., by Hughes Brothers & Bangs of the same city, well known as contractors for government work. The contract, which foots up to \$500,000, is for ten scows and two dredges. The former are to cost \$25,000 each and the latter \$125,000 each. The vessels are to be used in the dredging work at Gowanus bay, New York harbor, for which Hughes Bros. & Bangs some time ago secured the contract. All the work of construction on the vessels will be done at Jacksonville, Fla., and to that place Hingston & Son will next week send a large number of men. Each of the two dredges will be 135 feet in length, 50 feet beam and 15 feet deep, and each of the ten scows will be 200 feet in length, 40 feet beam and 15 feet deep. Each scow will have twelve pockets and will be capable of holding 1,600 yards of gravel. It is claimed that the dredges will be the largest ever constructed in America, each being considerably larger than the large dredge Pan-American which was described and illustrated in the Review some weeks ago. The machinery will be built by the Osgood Dredge Co. of Albany, N. Y., and will be ready to be placed on board as soon as the craft are completed.

NEW RAILROAD IN 1899.

According to preliminary figures prepared by the Railroad Gazette, which it says will probably be increased somewhat by the complete returns, the record for 1899 will be 4,557 miles of new railroad, built by 257 companies. For a year's total exceeding 4,000 miles we must go back to 1892 and 1891. In the four years following 1893 the average was only 2,000 miles. Last year the total ran up to 3,265 miles. It is to be said concerning the new trackage of this year that it represents almost entirely the response of the railroads of the country to the pressure of expanding business, and is in no respect like the unhealthy railroad building movements of the seventies, many of which had no larger necessity for their being than that promoters' dreams should be realized. Another fact about the year's track laying, as it affects the iron trade, is the great increase it signifies in tonnage for the rail mills, over the requirements of a similar mileage in what were considered the real railroad building days of the country. An addition of 4,500 miles of railroad in a year means now 650,000 to 700,000 tons of rails, as against 450,000 to 500,000 tons 15 years ago.

The American Steel Barge Co. has sold the whaleback steamer City of Everett, which was built at Everett, Wash., in 1895, to the Loebig Manufacturing Co. of Cateret, N. J., the consideration being, it is said, \$200,000. The vessel will be used in the transportation of phosphate from Port Tampa, Florida.

WHY ENGLAND FEELS AMERICAN COMPETITION.

BY WALTER M. McFARLAND,*

LATE CHIEF ENGINEER, U. S. NAVY.

The fact of American competition in British home and foreign markets has become so evident in some striking cases of late as to arouse a very natural inquiry with a view to determining, if possible, what has enabled Americans to enter a field where it seemed for so many years that the British manufacturers were absolutely impregnable. The specific cases which have called the greatest attention to the circumstance are the Atbara bridge and the supplying of Baldwin locomotives for some of the English railroads, and the reasons why British owners purchased in America rather than at home have been thoroughly exploited so that everybody understands them. I take it, however, that the object of the series of articles now running in *Engineering* is broader than a discussion of these few cases, and is really to take the shape of an inquiry as to whether, on the whole, opportunities and methods in America are better than in England for manufacturing industries, and, if so, in what the American superiority consists as viewed by a citizen of the latter country. The writer has the pleasure of knowing personally a number of very eminent gentlemen in English manufacturing enterprises, and may say at the very beginning that he believes them the peers of any manufacturers anywhere in enterprise and ability, and if these gentlemen could be considered typical of all English manufacturers, we might at once leave out of consideration any question of lack of progressiveness on the part of the proprietors; indeed, as is well known, in certain lines English manufacturers are not only fully abreast of what is done elsewhere, but are undoubtedly the leaders. However, from the statements in the English journals, and of Englishmen who have visited this country, it would seem that in some of the industries where American competition has been especially felt, the manufacturers have not emulated the example of their confreres in other lines, and have been going backward both in factory organization and in the adoption of new methods and new tools.

One point which seems to the writer deserving of attention is the fact that for a great many years the United States was unable to supply its entire home market. It must be remembered that the population of the country has increased very rapidly, due not only to a high birth rate, but to an enormous immigration. Until manufacturing enterprises were able to meet the demands at home, they were, of course, unable to compete with anybody outside. It is to be remembered, further, that the growth of manufactures in this country is of very much more recent date than in England, so that it required a considerable period to supply the experience necessary to make factories efficient and to develop the peculiarly American methods which prevail. It seems to be the tendency in all manufacturing countries where the people are progressive and enterprising to develop, in time, a greater output than is sufficient for home needs; so that it was inevitable in a country so richly endowed by nature as the United States, that when sufficient time had elapsed to enable the needs of the home market to be supplied, American manufacturers would enter the competition for the markets of the world. Apparently only a few people had thought of this tendency, and it was brought to popular notice by recent events, but the final outcome would have been just the same even if these particular cases had not occurred.

One of the greatest advantages possessed by manufacturers in the United States is the comparative freedom which they enjoy in establishing and conducting a business. The ease with which companies can be formed, land secured, and the facilities for transportation, are all, as we are led to believe, from what English writers have stated as conditions in that country, much greater in America than in England. It is not at all an uncommon thing in the United States for a manufacturing concern to receive a gift of the land necessary for its purposes, with freedom from taxation for a long period of years, and sometimes with a substantial bonus in addition, for locating in a special place, the object being to build up a factory village. These gifts, of course, reduce fixed charges, and thereby reduce the cost of the product, and, further, it is obvious that the factories would be located where there are decided natural advantages. The much smaller amount of government regulation of private enterprises which obtains in the United States than in England would also account, to a certain extent, for the greater strides in American industries. Several prominent Englishmen, well acquainted with the circumstances, have told the writer of a number of promising enterprises which were absolutely throttled in England by parliamentary enactments, or governmental regulations which made it simply impossible to get any benefit from improvements; a notable example being in the case of motor vehicles, where for a long time the permissible speed was kept at something like four to six miles per hour. It may be that in America we have too free a hand, but it would certainly seem that in England the reverse is true. We are led to believe in this connection also, that in many cases enterprises in England are hampered by too great a consideration for vested interests which would be unfavorably affected by new ones.

There seems also in the United States to be a greater disposition on the part of large capitalists to take chances in embarking in new enterprises. This is due, perhaps, to the fact that a vast majority of our wealthy men have made their fortunes instead of inheriting them, and the very qualities which enable a poor boy to become a wealthy manufacturer, necessarily make him better fitted for launching out in new enterprises and taking great risks than the capitalist whose fortune is inherited, and who has never had the experience of building up a fortune himself. Somewhat connected with the foregoing thought, and also with the freedom from tradition natural in a very new country, is the fact that there seems a tendency in America never to consider anything, however satisfactory, as a finality, but always to be reaching out for something better. We have all heard the story of the English bishop on his deathbed, who, when being consoled by his chaplain with the statement that he would soon be

so much better off, replied that he had been entirely satisfied with his condition in this world; and it is possible that something of this frame of mind has been existent with respect to manufacturing in England, whose civilization and conditions are of such long standing; while, as already stated, the innumerable cases of wealthy men who have risen from very humble circumstances in this country hold out a constant incentive to others to follow their example by going in for new enterprises, and often taking great risks.

It hardly seems necessary to refer to the greater extent to which machinery has replaced hand labor in the United States than in England, as this has been discussed so often; but it is only fair to remark in this connection that in a great many cases Americans were really driven to this by the impossibility of securing an adequate amount of labor. Of course the fact, which soon became patent, that it was decidedly cheaper in the long run to make a considerable investment in labor-saving machinery, has led to constant efforts to devise such machinery in all lines of manufacture. A summary of what has thus far been said would be that many natural conditions in America are more favorable to manufacturing efficiency than is the case in England; that the peculiar social conditions of the country tend to develop a greater amount of enterprise on the part of manufacturers; that there is greater freedom to enter and pursue manufacturing enterprises in the United States than in England, and, finally, that while in many industries, English factories take the lead, in a number of others, on the showing of Englishmen themselves, there has been an unwillingness to adopt the latest and most advanced methods and tools.

Coming now to the question of labor, it may be well to remember the report written some years ago by Mr. J. S. Jeans, called "England's Supremacy," in which a comparison is made of the conditions of labor in all the manufacturing countries of the world, and where it was shown very thoroughly that it is not the cheapest labor which makes the cheapest product by any means, the most notable instance being where labor was the very cheapest; and if the writer remembers correctly, Mr. Jeans showed that in several lines of industry the value of the output per operative in the United States was materially higher than in any other country; and, finally, that the cost of a given output was less in the United States than in England, in spite of the fact that wages in the United States were higher. It seems to the writer that any explanation of this fact, which has a bearing of the greatest importance on the question under discussion, is due in part to the institutions of the country, or rather to the social conditions. In the United States it is not only possible, but is a very frequent occurrence, for a man to start as a workman and finish as a millionaire, holding as high a social position as anybody, and both meriting and receiving the greatest respect of all around him. The greatest benefactor of one of the leading colleges of this country was just such a man. Where this is possible it gives workmen an incentive to do their best work, such as is impossible in a country where social classes are fixed and almost absolutely rigid, and where it is exceedingly difficult for any but men of remarkable genius to rise from the ranks. In industrial America the conditions are very much like those in Napoleon's army, where every soldier carried the baton of a marshal in his knapsack. Another thing to be remembered is that, altogether apart from the superior ability of native American mechanics (of which we Americans are so fond of boasting), the working men of today in American shops are by no means all of American birth, a very large proportion having come from different countries in Europe. Now it goes without saying that the workmen who emigrate are, as a rule, those with enterprise and push, so that the chances are more than even that these are the best workmen so far as manual skill goes, in addition to being the most enterprising. If this is a fact, it would mean that the cream of the English, as well as of the Continental, workmen are coming to America and assisting in the fine work in the factories here, to the decided reduction of the average ability of the workmen who remain. What induces these men to come to America is, of course, what has been stated just before—the chance to rise from the class of manual workers to that of directors of labor.

It seems to an American that one fearful handicap to success in English industries is the short-sighted and ruinous policy followed by the labor unions. The great engineers' strike, which began in the summer of 1897, was an illustration of this fact; and, although the workmen may not have realized it at the time, and possibly do not even yet, there can be little doubt that the masters were their true friends in resisting the claims which they then put forward, and which, if they had been conceded, would have effectually ruined English industry. No fair-minded man, however cold-blooded he may be in business for a moment denies that working men have rights as well as owners, but the men too often fail to recognize that the proposition is equally true when stated inversely, and that the owners have rights as well as themselves. To the writer it seems very clear that until there can be such an understanding between the men and the masters in England as to enable the men to realize that their true interest lies in leaving the masters absolutely free to organize their factories and conduct their business in the most efficient way, English industry will be terribly hampered in its competition with countries where better conditions prevail. It seems unnecessary to say anything about the American system of manufacturing to standards, and of endeavoring to get consulting engineers to order these standards rather than special machines, as this has already been thoroughly discussed in *Engineering* and elsewhere.

The most obvious thing to do, if one believes that another runs his works better than he does his own, is for him to go and see how the other fellow does it; and the fact that English manufacturers are not asleep, is shown by the great number who are visiting America to study the methods in the most successful shops. Some have even gone so far as to get acknowledged American leaders to come to England and re-design their works; one case being specially notable, because the man who was asked

*Mr. W. M. McFarland, late chief engineer, U. S. Navy, has for some time past been connected with the management of affairs of the Westinghouse companies. This article, reproduced from *Engineering* of London, is one of a long series of communications from Americans on the same subject.

to plan the improvements had been refused admission to the works about twenty years before, when he, desiring to see one of the best factories in his line, had asked permission to go through. As was stated in the beginning, the writer's personal acquaintance in England, and with English methods, satisfies him that there is no reason to doubt that England will be able to maintain a front rank in the race for industrial supremacy; but he believes that the time has passed when she can expect to hold an undoubted pre-eminence as she once did. It would, in fact, be very strange indeed if the United States, composed so largely of people of the same race, should not be able also to take a front rank in this industrial warfare. Whatever the natural conservatism of Englishmen, there can be no doubt that now they are awake to the fact of the competition from the United States and other countries, they will see to it that they are not handicapped by antiquated methods of machinery, and if the workman does his part, there is no reason why Englishmen should dread that Macaulay's description of the New Zealander on London bridge is likely to be realized, even in a remote future.

INTERNATIONAL CONGRESS OF NAVIGATION.

The United States commission to the Paris exposition of 1900 has just received information relative to the international congress of navigation to be held under the auspices of the exposition. The congress will open July 28 and will last seven days. The congress is divided into four

SHORTER DAY IN BRITISH SHIP YARDS.

The crusade for a shorter working day now in progress in the ship yards of Great Britain is referred to in an interview with Alexander Wilkie, general secretary of the Associated Shipwrights' Society of Newcastle-on-Tyne, who visited this country as a representative of the British Trades Union Congress at the recent convention of the American Federation of Labor. Mr. Wilkie is quoted as saying in part:

"In British ship yards the workers are striving to bring about an eight-hour work day. At present nine hours is in vogue. All over Great Britain not more than fifty-three or fifty-four hours of work a week are exacted in the ship yards and engineering establishments, and in many of them forty-eight hours is the limit. This has been the rule for years. It is a state of affairs due entirely to the efforts of organized workmen. In former years when some of the trades were imperfectly organized, disturbances between employers and employes were continually arising, but now, since most of the trades have become completely organized, as have the employers, disputes are rare. When a difference arises the firm at once wires for the representatives of the trade affected—the one who in this country is known as a business agent. Over 90 per cent of the labor disputes are adjusted in this way. When this method fails the general representatives of the employers' association meet in conference the general representatives of the society of the trade affected, and almost without exception an agreement is reached without any resort to extreme



PILOT HOUSE OF THE STEAMER ALEXANDER MCDUGALL AFTER HER LAST TRIP DOWN LAKE SUPERIOR.

sections, as follows: First section, interior navigation; second section, international navigation management; third section, maritime navigation; fourth section, maritime navigation management. Only the members of the congress have the right to attend the meetings and take part in excursions, to present papers and to take part in the discussions. Each member at the time of his registration should make known the section or sections in which he desires to take part. The sectional deliberations will open by a resume of the preparatory reports. The deliberations in both sectional and general meetings will be held in three languages—French, English and German. Speakers cannot occupy the tribune more than fifteen minutes. The membership fee is 25 francs and should be sent as early as possible to the Secretariat General du Huitieme Congres International de Navigation, Place de la Bourse, Paris.

William B. Motheral of North McGregor, Ia., is the inventor of the latest scheme for increasing the speed of vessels that has been unfolded to a credulous public. A working model embodying the new idea has been taken to the Washington navy yard where it will be tested. Briefly stated the plan of the Iowa inventor is to use air as a lubricator for the removal of the friction between the bottom of a vessel and the water. It is proposed to apply this principle by having the bottoms of vessels punctured with a large number of small holes through which air will be continually pumped. The under part of the body, which Motheral has had constructed for experimental purposes is wedge shaped, it being designed to rise further and further out of the water as it is driven through it, so that, according to the claims of the inventor, there would be practically no resistance whatever.

measures. Strike is a word rarely heard in our country. In the history of English ship building business has never been so prosperous as at present. We cannot supply the demand for men. To the student of labor the shortening of the work hour is the only means whereby the workers can obtain a permanent improvement of their position."

Samuel L. Gracey, United States consul at Foochow, China, who recently arrived home on a visit, has a keen appreciation of the necessity for the upbuilding of our merchant marine. Speaking of this matter recently in connection with a discussion of conditions in the Orient and on the Pacific, Mr. Gracey said: "What we want, however, is more American shipping. It is urgently needed, especially in the Pacific. I came from Japan on a steamer of the California & Oriental company, an American line, which though only a year old, is overcrowded with freight business. It has six steamers of its own and has chartered two others. The vessels have their cargo space taken up far in advance of the sailing dates. Recently a steamer of this line had to make an extra trip away north to Seattle to get 3,500 bags of flour for Japan. There was no other way of getting it. My son recently lost a large sale of flour which he could not fill, owing to the fact that he could not get facilities to ship it before next February."

At least fifteen months of work and an expenditure of \$350,000 will be required to thoroughly overhaul and repair the cruiser Olympia, according to the estimate of the naval board of inspection and survey. If the report of the board is approved the work will in all probability be done at the Boston navy yard.

MARINE REVIEW

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Three new auxiliary cruisers of the second class are likely to be added to the American navy under the terms of a contract to be advertised shortly by the post office department. The vessels referred to are those now building to the order of the Oceanic Steamship Co. of San Francisco. They are vessels of more than 5,000 tons burden and must maintain a speed of 16 knots, covering the distance between Sydney, Australia, and San Francisco in twenty-one days. The government contract contemplates a mail service for an optional term of either five or ten years, beginning Nov. 1, 1900. The Oceanic company now receives a subsidy of \$80,000 in addition to the usual allowance for transporting the mails to Sydney. The intent of the new service is to supplant this system of contract service and subsidy. In framing specifications for this service the department has been guided by the subsidy act of 1891, under which the vessels of the American line were made auxiliary cruisers. Should the Frye-Payne shipping bill become a law it is thought that the prospective bidders for this service will permit their proposals to stand.

A great many remarkable records for elevating grain have been made at Buffalo since the introduction of steam shovels several years ago, but what it is claimed is the most creditable achievement to date was made a few days ago in the unloading of the steamer H. W. Oliver at the C. J. Wells elevator. Work was started at 7:55 o'clock in the morning, and at 9:55 33,000 had been taken out. An hour later the record was 49,600, and at 11:55 65,000 bushels was safely in store. A stop was then made for dinner. At 1:30 o'clock 81,000 and at 2:30, 93,000 had been elevated. The finish was at 3:20, completing the cargo of 99,192 bushels. Allowing for shifting of the vessel and dinner the actual working time was six hours, an average of 16,532 bushels per hour.

It is reported from England that very extensive improvements are to be made in the American liner Paris, which was ashore on the Manacles rocks. The contract recently entered into with Harland & Wolff of Belfast, Ireland, is said to provide, in addition to a thorough overhauling, for an addition of 100 feet to the Paris, which will give the vessel a total length of 665 feet. It is said that the vessel will also have the eight boilers which at present constitute her equipment replaced by a battery of steam generators just double in number. As already stated in the Review, the Paris will be renamed when she goes back into the transatlantic service. In all probability Philadelphia will be the name chosen, although a strong effort is being made to have the boat named Chicago.

It is interesting to note that the board of inspection and survey which has been making an inspection of the cruiser Olympia, as noted elsewhere in this issue, includes in its report reference to the necessity for refilling the cofferdams of the vessel with cellulose. It is stated that the examination of the Olympia showed that her cellulose protection was well soaked in water. A general replacing of all woodwork with light steel is recommended. The board recommends that partitions between state-rooms be constructed of corrugated steel and that metal hinged bunks be provided, and suggests the advisability of covering parts of the ship devoted to living quarters with asbestos sheathing, as this will reduce the danger from fire.

The torpedo boat Shubrick, which was launched with great ceremony at the yard of the William R. Trigg Co. at Richmond, Va., some time ago, narrowly escaped destruction by an accident that happened a few days since. The vessel, which is 90 per cent completed, was lying at a dock at the northern end of the ship yard, parallel to which and but a few feet away runs a high trestle of the Chesapeake & Ohio railroad. As the result of a collision following the breaking of a train, freight cars were piled up on this trestle and one of them, loaded with seed, fell from the trestle, missing the Shubrick by less than a foot.

The Bethlehem Steel Co. of Bethlehem, Pa., entertained the members of the naval committee of the house of representatives at their magnificent plant a few days since. All branches of the institution were shown to the visitors, who saw armor plate for the battleships Alabama and Illinois and the monitor Wyoming in process of construction and were also given an opportunity to inspect the Krupp armor plate being made for a Russian battleship. It is understood, of course, that the Bethlehem company has purchased the right to make armor plate by the Krupp process in this country.

The Wm. Cramp & Sons Ship & Engine Building Co. has notified the Russian government that the battleship Retvizan, now building at the Philadelphia yard, will be launched in April and that the cruiser Variag, also under construction by the Cramp company for the Russian navy, will be ready to leave the yard at the same time.

The Neafie & Levy Ship & Engine Building Co. of Philadelphia are nothing if not prompt. They have already begun the preliminary work on the cruiser Denver, for which they have the contract and it is expected that the actual work of construction will be under way in less than six months.

A HISTORY OF AMERICAN PRIVATEERS.

Edgar Stanton Maclay, whose "History of the United States Navy" has won for him the sincere appreciation of all students of our progress in warfare on the high seas, has followed up this work with a volume—supplementary to it in a certain sense—of which it may well be said that it is worthy to rank beside the history just mentioned—certainly the highest praise that could be bestowed. The volume just from press is entitled "A History of American Privateers," and the reader wonders when he has perused this intensely interesting book that it should have been possible for so vast and highly important a field to have remained so long without a chronicler. At any rate it will need few in future, for Mr. Maclay has in his characteristic style covered the ground with remarkable thoroughness. The volume is dedicated to Theodore Roosevelt, who is spoken of as "the pioneer of the modern school of naval writers." In the opening chapters the whole subject is treated broadly and it is shown conclusively that in both wars with England our privateers were a most important if not a predominating feature of our early sea power. Then follows stories in detail of all the principal rovers of the sea in the early part of the present century, or the latter part of the last, and as may readily be imagined these narratives are very interesting.

There was not until Mr. Maclay's work came from press any complete record of American privateers and the author acknowledges at the outset his realization of the fact that he has entered upon a new and most difficult field of historical research. In writing his "History of the United States Navy," Mr. Maclay had the official reports and other reliable records on which to base his work, but in attempting a history of American privateers he found himself entirely cut off from this solid basis and was dependent on the fragmentary and scattered records which are to be found in the periodicals of that day and on the private letters, logs and traditions that have been preserved by descendants of the privateersmen. These records are scattered all over the United States, and certainly the author is not more deserving of praise for his patience and persistence in collecting their contents than for the complete and connected narrative that he has managed to evolve from records, which at first inspection seemed to be lacking in many important links.

The arrangement of the work is admirable. The more notable privateers are each made the subject of one or more chapters, while the craft (their operations were of lesser importance) are grouped either with reference to the periods of their activity or to the ports from which they sailed. As a result the book has special value as a work of reference, research necessary for the investigation of any given topic being reduced to a minimum. The book is most handsomely bound and the text is accompanied by upwards of one hundred illustrations, embracing reproductions of contemporary pictures, portraits and documents, and also original illustrations by Mr. George F. Gibbs. Published by D. Appleton & Co., New York city. Price \$3.50.

AREA AND RAINFALL OF THE GREAT LAKES.

The special report on the subject of lake regulation by means of a dam in the Niagara river, recently submitted to congress by the United States Board of Engineers on Deep Waterways contains the following table showing the area of the surfaces of the great lakes and watersheds, as determined by the best authorities:

Lake	AUTHORITY.			Area of Watershed.
	L. Y. Schermerhorn.	L. E. Cooley.	T. R. Russell.	
	Square miles.	Square miles.	Square miles.	Square miles.
Superior	31,200	31,800	32,060	48,600
Michigan.....	22,450	22,400	22,336	45,700
Huron	23,800	23,200	22,978	52,100
St. Clair.....		495	503	6,320
Erie	9,960	10,000	9,968	24,480
Ontario.....	7,240	7,450	7,243	25,530

The values given by Mr. Cooley have been used in the discussion of the lake regulation problem with the exception of that for Lake Erie, the area of which has been redetermined by the board of engineers and found to be 9,932 square miles.

The average annual rainfall on the lake basins, as furnished by the United States Weather Bureau, is as follows: Lake Superior, 28 inches; Lake Michigan, 33 inches; Lake Huron, 32 inches; Lake St. Clair, 35 inches; Lake Erie, 36 inches; Lake Ontario, 33 inches.

A report of the work done during the past season on one of the large breakwaters of the Atlantic coast, the harbor of refuge at Lewes, Delaware, shows that the superstructure of the work has been practically completed from the west end to the angle for about a mile, and from this point to the end of the breakwater it has been practically completed to low water for about 2,700 feet. A total of 419,642 tons of Belmont granite have been placed in position and the season's work foots up in cost to \$550,000. The height of the breakwater from the sea bottom to its summit varies from 12 to 55 feet, according to the variations of the sea bottom. To date the breakwater has cost \$1,260,000, and it is expected that it will be finished by the summer of 1901 at a total cost of \$2,350,000, including the expenditure necessary for the construction of ten ice piers. The total length of the structure will be 8,000 feet.

In the regular weekly statement issued by the bureau of navigation, treasury department, the steam yacht Virginia, recently completed at Bath, Me., is listed as of 441 gross or 212 net tons. The schooner Jennie French Potter, launched at Camden, Me., a few days since, is of 1993 gross or 1794 net tons, and the schooner Mary W. Brown, another new Bath-built craft, is of 2153 gross or 1907 net tons. The schooner Ohio, still another recent product of the Bath district, is of 1629 gross or 1506 net tons burden.

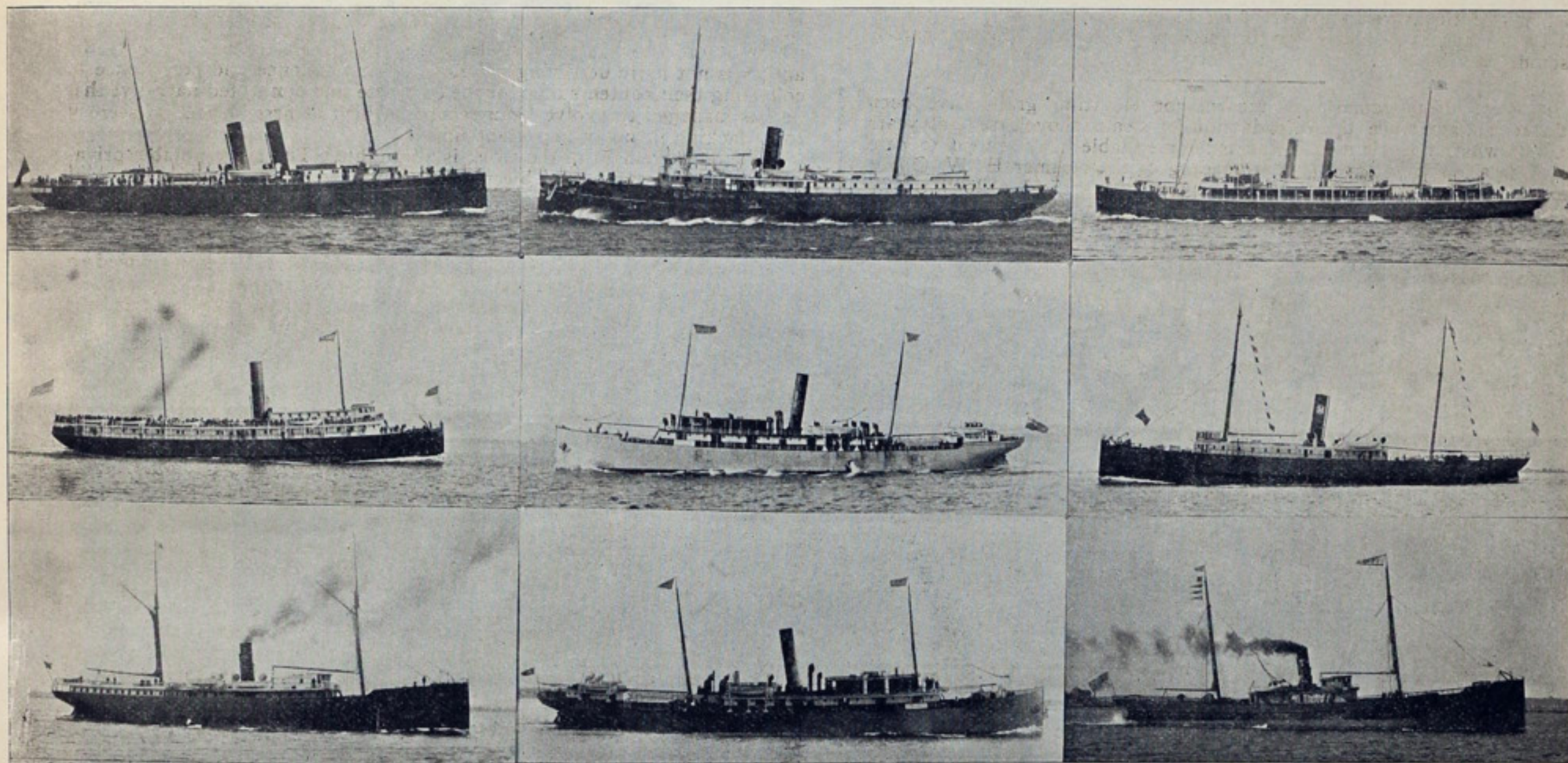
UNITED STATES COMPETITION.

FROM SYREN AND SHIPPING OF LONDON.

No British man of business, be he ship owner, manufacturer, or merchant, can regard with any but the deepest interest the annual message presented by the president of the United States to congress. In fact, it has become customary to seek in it a forecast of possible or probable alteration of the conditions under which British and United States industries sympathize or clash. Looked at from such a point of view, this year's message is fraught with special importance. The great American republic has emerged from the trammels of the Monroe doctrine, and, hence, must be regarded as a more real competitor with our shipping business and our foreign markets than she has been in the past. We find in President McKinley's message three factors which go to prove the reasonableness of this view. In the first place, the territorial limits of the republic now include the Philippine islands, and with the suppression of the existent rebellion there is bound to be a big effort on the part of American manufacturers to exploit the commercial possibilities of the islands to the fullest extent. "The future government of the Philippines," the message runs, "rests with congress. They cannot be abandoned. The suggestion that we could renounce our authority and give the islands independence, while retaining a protectorate, will not be found worthy of the serious consideration of congress." These carefully considered words of the American president clearly point to the establishment of a closer relationship between the Philippine archipelago and the United States—a relationship in which political power and opportunity will be a vital factor in determining the commercial policy to be adopted. But, while we are interested to a

"Last year," he stated, "American vessels transported a smaller share of exports and imports than in any former year, and the measure of our dependence on foreign shipping was painfully manifested to our people from necessity."

Doubtless, the American legislature will before long be called upon to consider this all-important question of merchant tonnage. A reference to the report of the commissioners of navigation shows the lines upon which it is suggested Congress should take action. It is advised that a system of bounties should be established, graded upon the mileage navigated by American vessels while engaged in the foreign carrying trade, as compensation for the training of seamen available for the national defence; the system to have regard also to the construction of vessels which may be promptly and economically converted into cruisers, transports, colliers and supply ships for the use of the government. This is protection, or subsidizing of a mercantile marine, which is only one step behind the brutal, but unsuccessful, methods adopted by France to create and encourage native ship owning. It is further urged that the principle of the act of May 10, 1892, should be extended, with a view to more universal adoption. It will be remembered that under this act of congress the New York and Paris, though foreign built, were put on the American registry. The adoption of this suggestion, however, is fraught with difficulty even to its proposers, for it is stipulated that the United States coasting trade should be conserved to American-built vessels. Another proposition, aimed at resurrecting the mercantile marine of the states, advocates a moderate increase in the rates of tonnage taxes, on the lines of reciprocity with the dues levied in foreign harbors on United



BOSTON—Yarmouth S. S. Co.
ST. CROIX—International S. S. Co.
INDIAN—Boston and Philadelphia.

JUNIATA—Merchants' & Miners' T. Co.
BROOKLINE—Boston Fruit Co.
BARNSTABLE—Boston Fruit Co.

PRINCE EDWARD—Boston and Yarmouth.
H. M. WHITNEY—Metropolitan S. S. Co.
ORION—Boston Towboat Co.

A GROUP OF ATLANTIC COAST STEAMERS.

considerable extent in the future of these islands, we are still more deeply concerned with the evident intention of the republic to secure an increased share of trade with China. Here we have vital interests at stake, for the bulk of Chinese trade is in British hands. On this point President McKinley was most explicit—too explicit perhaps for those who see in the up-to-date competition of the United States a menace and a challenge to the retention of our hard-won possession of the Chinese markets. Clearly, the anti-expansion, or western hemisphere party, in the states are about as unpopular there as is the Little Englander with us. The president rightly gauged public opinion when he stated that he renewed his recommendation to "appropriate the requisite financial aid for a commission to study the commercial and industrial condition of China, and report regarding the opportunities for, and obstacles against, the enlargement of the markets of China for the raw products and manufactures of the United States." Clearly, our American cousins are grimly in earnest on the subject of commercial expansion, and British manufacturers and merchants would do well to take time by the forelock and strengthen the strong position they already hold in China as the party in possession.

A consideration of the American occupation of the Philippines, and the forthcoming effort to secure a share of the trade with China, brings us to an examination of the means to be employed—the third factor which makes for increased competition with Great Britain. If the United States is definitely determined upon monopolizing, in whole or in part, the trade of the Philippines, and exploiting a big business with China, then it is a necessity of such effort that her mercantile marine be very materially augmented. Needless to say, this is duly recognized by President McKinley, and special allusion was made to the matter in his address to congress.

States shipping. A further suggestion is that the trade between the United States, Porto Rico and Hawaii—and in all probability the Philippines as well—and the coasting trade of these islands be limited to American-built vessels. These proposals are not the irresponsible suggestions of private citizens, but the matured scheme of the "navigation" officials, so that there is reason to think that when congress takes up the subject it will legislate on the lines laid down for its guidance. From this, it is patent that American competition with Great Britain, both in shipping and manufacturing enterprises, will not be relaxed, but increased in the next few years. We do not wish to imply that there is any need for dependency at such prospective competition; we merely urge watchfulness, and a yet closer attention to those persistent and enlightened efforts which have enabled British ship owners and manufacturers to attain their present position.

If a steel ship building industry is not developed at New Orleans it will not be the fault of the Murphy Iron Works of that city. This firm secured a contract from the Texas & Pacific Railroad Co. to rebuild the large steel transfer boat Goldsboro on new lines, and inasmuch as a vast amount of steel frame and plate work was required, the New Orleans firm found itself compelled to install a compressed air plant, several large cranes and indeed virtually provide the full equipment of a ship yard. Then difficulty was encountered in securing properly trained mechanics and the firm has therefore established in connection with their works a training school where over a hundred young men are under instruction to fit them for work as steel ship builders. The firm has secured three more contracts similar to the above.

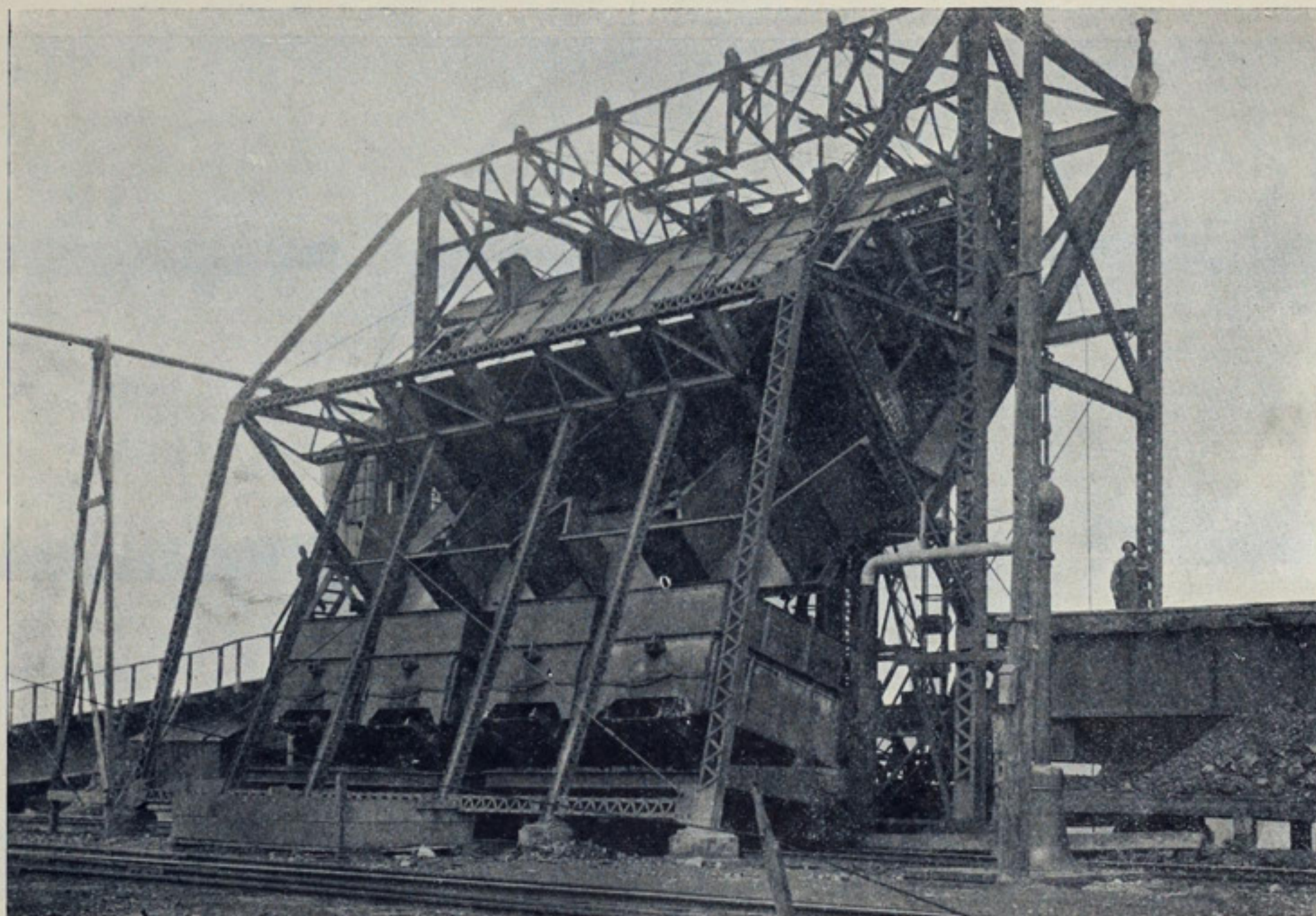
CAR DUMPS AT FURNACES.

LATEST TYPES OF MACHINERY FOR THE HANDLING OF IRON ORE IN FURNACE YARDS—EQUIPMENT AT THE NEW YOUNGSTOWN WORKS OF THE NATIONAL STEEL CO.

Readers of the Marine Review who have followed the record in these columns during the past few years of the development of machinery for transferring iron ore from lake vessels to railroad cars or dock stock piles will be interested in some of the innovations recently introduced at blast furnace plants for transfer of the ore from the cars in which it is received from lake ports to stock piles or direct to the furnaces. The latest practice in this line is well illustrated at the new works of the National Steel Co. at Youngstown, Ohio. We are indebted to the Iron Trade Review for permission to reproduce the illustrations and text dealing with this subject.

The ore stock yard at the Youngstown works is spanned by two steel conveyor bridges. These with their power equipment, and the other ore handling machinery, consisting of a Hulett patent car dumper, were built by the Webster, Camp & Lane Machine Co. of Akron, O. The bridges have a span of 260 feet, with a cantilever extension of 41 feet over the ore bins at the end next to the furnaces. Each bridge is mounted on a two-track machine tower at its outer or receiving end, and on a one-track rear tower next to the furnaces. At their receiving ends the bottom chords of the bridges are 54½ feet above the bottom of the ore pit and at the rear tower 80½ feet, giving large storage room.

the Webster, Camp & Lane Machine Co., to the Buffalo, Rochester & Pittsburg Railroad for its coal docks at Buffalo, except that the overhead trolleys for conveying the material to vessels are omitted. Steam is piped to the engine for operating the car dumper from the blast furnace boilers. After the loaded car is run into the car dumper, the operator sets the deflector for either a short hopper car with ore loaded nearly uniform through the car or for a long gondola with ore loaded at each end over the trucks. The cars of seventeen tons capacity which receive the ore after it is dumped are of the side-dump pattern. The transfer car on which they stand side by side is pushed by a locomotive under the front or machinery tower of the bridge in alignment with the four tracks on the latter. These tracks converge to one main track on the bridge, the switches being automatically operated by the car as it passes over them. One by one the cars are drawn up the inclined track and on through the bottom chords of the bridge and dumped at any point desired. This is accomplished by a lever underneath the car engaging a knuckle, causing the two hinged side plates to be thrown outward. A second track is suspended below the chords of the bridge with a trolley running thereon, for rehandling the ore from stock pile, emptying it into cars whence it is dropped into the bins. An automatic bucket of ten tons capacity is used in rehandling operations. It is filled by dragging it up the stock pile, which is accomplished by proper manipulation of the trolley by the operator in the machinery tower. In practice there will be no frequent moving of the bridge. When the stock pile from which ore is being drawn is not opposite the bin into which it is desired to put the ore, the ten-ton bucket will empty into motor cars which move



HULETT CAR DUMPER AT THE BLAST FURNACES OF THE NATIONAL STEEL CO., YOUNGSTOWN, O.

The bridges travel along their tracks at a speed of 50 feet per minute by means of gearings connected with two 130 horse power General Electric motors to each bridge. These motors also furnish the power for handling the ore on the bridge, as well as rehandling it from stock pile, suitable drums and gearing being connected with the motors. The motors take their current from an overhead trolley above the machine tower. The machinery is located in the main tower, and an operator's house is placed next to the bridge in a position giving the operator an unobstructed view of the ore cars as they move on the bridge, for this machine delivers ore to the stock piles in small cars instead of buckets.

From the yard in which loaded ore cars are delivered from the various connecting railroads, the track as it extends to the car dumper is down grade 1¼ feet in 100. The foot of the grade is 885 feet from the yard and the cars move this distance by gravity to the foot of a short incline which leads up to the car dumper. In a pit below the loaded car as it reaches the foot of the incline is a disappearing car. This is drawn up out of the pit behind the loaded car by winding drums located on the car dumper. A push bar on the disappearing car engages the drawhead of the ore car, pushing it up grade into the car dumper. The car dumper consists of a substantial steel structure, in which is a platform to receive the loaded car. This platform is pivoted at one side, and when the platform with the carload of ore is rotated around this axis, the car is raised sufficiently high to discharge the ore over an apron into four small steel cars of seventeen tons capacity each, mounted on a transfer car standing alongside the car dumper. To insure equal distribution of ore in the four smaller cars movable deflectors are pivoted to the apron of the car dumper. These are moved by a steam cylinder, with cataract locking cylinder, both being under the control of the operator. Gondola, wood or steel hopper bottom cars of twenty to sixty tons capacity can be handled.

The car dumper is of the same general design as that furnished by

to the proper bin and drop their contents. It is possible to bring a train of drop-bottom ore cars directly to the tracks over the bins, but the usual method will be by way of the stock yard and the conveyor apparatus.

The capacity of the car dumper is thirty railway cars an hour. Each of the bridges is capable of handling fifty of the seventeen-ton cars per hour, or an equivalent of twelve and a half railway cars per hour. Three men are required for the operation of the car dumper, including the man who places the cars in position upon it. Two operators are required for each conveyor bridge and three men on the locomotives for moving the transfer cars. The cost of handling ore from railway car to ore-pit or from pit to bins is estimated at less than 1 cent per ton.

The Chesapeake, new full-rigged sailing vessel designed as a practice ship for the naval academy and built at the Bath Iron Works, Bath, Me., is credited with a very successful governmental trial, which took place off the Massachusetts coast a few days since. The ship was tried for seaworthiness only. For two and a half hours the ship was sailed in a southeasterly breeze and moderate sea, carrying all the sail deemed expedient. In a twenty-mile breeze the vessel made 8 knots close hauled. The performance was entirely satisfactory to the official trial board, which consisted of Commander W. H. Emory, president; Naval Constructor Washington Capps and Lieut. Commander Richard Henderson.

Evidently the strikers at the works of the William Cramp & Sons Co., Philadelphia, have about come to the conclusion that they cannot dictate to that firm. They are said to be applying by letter for positions in ship yards in other parts of the country. The cost of maintaining the strikers in idleness has been almost \$1,000 per week, and the funds of the national organization to which they belong have run low as a result of the constant drain that has been made upon them.

FROM A BUFFALO POINT OF VIEW.

NO GREAT INTEREST IN THE NIAGARA DAM SCHEME, BUT A PROPOSITION TO VOTE A MONUMENT TO W. J. CONNERS FOR THE STIMULUS THAT WILL BE GIVEN TO ERIE CANAL IMPROVEMENT ON ACCOUNT OF HIS CANADIAN PROJECT.

Buffalo, Dec. 27.—If there is anyone qualified to settle the problem of the Niagara dam, more especially as to its after effects on the shore in seasons of high water, Buffalo is one of the points that would be more than glad to have him stand up and speak. Since the introduction of the Corliss bill in congress the subject has taken a new interest and there are all sorts of "views" expressed on the matter, most of them largely conjectural and all manifesting a condition of uncomfortable doubt, if not suspicion of the part of the dock public. There is so much "disinterested" selfishness in such matters that our people very well know that the man who introduced the bill has, ten to one, never taken up the effects of such a dam on the water front effected. Chicago, according to its enterprising mayor, is going to ask the government to dig it a ship canal to the Mississippi and knock out the east still more than it has already done by cheap through freights, and it would not think of giving up a plan promising profit to the city for any little consideration like the welfare of the country at large. Well, it is safe to say at the start, as all marine men who are posted do say, that the Corliss bill does not stand a ghost of a chance of passing, at least in its present condition. One man says that it has no provisions worth considering beyond the perpetuation of the deep water-

port. So the committee will say to the state that if the Erie canal can be put on a footing like other carrying routes the commerce of New York and the Buffalo-New York route are safe and New York has already anticipated the step by declaring for a canal that can move wheat from Buffalo to New York for a cent a bushel. Then let New York city give the canal suitable terminals and the double menace from the roads and Canada is beaten off once more, all of which is in the interest of cheap handling and carrying.

The world moves, but it so generally happens that the business world does not move till it is obliged to that we will welcome anything Canada can do if that is necessary to set us in motion on this side of the line. If it has the desired effect we will vote a statue to Mr. Connors.

JOHN CHAMBERLIN.

MORE SUCCESSFUL TRIALS OF MILLER CONVEYOR.

In a fresh easterly breeze and quite a heavy swell from the same quarter, the final trial of coaling ship at sea twenty miles off Sandy Hook by means of the Miller conveyor, made by the Lidgerwood Mfg. Co. of New York, was successfully accomplished on Friday last by the collier Marcellus, while being towed by the battleship Massachusetts. Instead of operating slowly, as anticipated, in a seaway, the conveyor transferred more coal in a given time and at 420 feet distance, against the previous 300 feet, than in smooth water. Excluding stoppages for swinging the ships into position, eighty trips were made in eighty minutes, 160 bags of coal, each weighing 420 pounds, being transferred from ship to ship in that time, the collier pitching and rolling considerably, and the warship's for-



ORE PIT, BRIDGES AND ORE TRANSFER CARS AT THE OHIO WORKS OF THE NATIONAL STEEL CO.

ways commission, which it does very neatly, and another notes that the canal that is to make navigation possible on the lower side of the dam is not provided for.

The other day there came up a storm that in a short time raised the water 7 feet in Buffalo harbor and it went down more suddenly than it rose. Although there are those who explain that the dam could be built so that it would not contribute to such sudden fluctuations, yet when they did occur after it was built there would be any amount of claims for damages on that score. Vessel men say that the direction of the mouth of Buffalo creek and its position just above the dam are exactly suited to the driving of great currents up the creek whenever a southwest storm comes up, no matter whether the normal condition of the lake is high or not. We shall see, maybe, but not yet.

As to the Connors venture in Montreal and its prospective success in some form there are not a few people who are secretly glad of it. Buffalo has something to say to the state now by way of argument in favor of the speedy improvement of the Erie canal. As matters stood the Canadian canals were always getting into better form just after they were again out of date, and it is even now hard to see how much can be done over that route even with the St. Lawrence canals down to 14 feet, but the possibility is greater of course.

At any rate New York city is pretty thoroughly scared. The governor's canal committee met there last week and the members who came back from there say that it was besought on all sides for some assurance that the St. Lawrence route would not still further reduce the city's waning commerce. The reply to all this uneasy casting about was that New York's lighterage and other terminal charges were to blame for most of the decline, but New York sees no way of attacking these and says so. The railroads are in full possession and they will look after their own advantage, whether that takes the business to New York or some other

ward deck being continually wet by the sea, into which she plunged while steaming between 4 and 5 knots an hour.

Capt. C. J. Train, commanding the Massachusetts, and his officers expressed great satisfaction at the result of the trials and said that to them it proves the system is capable of supplying coal at sea in any weather when it is fit to "coal ship" at all.

The trial board was composed of Commander A. B. Lillie, Lieut. John B. Bernadau and Lieut. W. R. Rush, all of the United States navy, Chief Boatswain William Anderson, U. S. N., was in charge of the men on the Marcellus and Boatswain Stokley of those on the Massachusetts.

A series of experiments are being conducted at Havre with an invention by Baron d'Alessandro of floating nets for use in moderating the force of waves during storms. It is said that the invention is superior to oil in the effects produced. The nets have been vastly improved since the first experiments were made some seven or eight years ago, and it is now claimed that well-buoyed and ballasted nets will withstand the most powerful currents and violent tempests and will prove of value not only in storms but also for protection at entrances to ports, difficult passages in the neighborhood of lighthouses and the defense of exposed fishing stations against heavy seas.

Secretary of the Navy Long will in the near future send to the naval committees of congress a bill providing for the construction of two 3,000-ton vessels for use in training seamen. Attention will be called to the obsolete type of ships now employed in the training service. The Hartford is the only modern vessel. The Alliance will go out of commission permanently after another cruise, and neither the Essex nor the Lancaster will be good for more than a few years more service. About \$600,000 will be required for the construction of the proposed new ships.

FUTURE OF THE ITALIAN NAVY.

The Italian minister of marine has recently expressed his views with regard to the changes which are destined to be made in the Italian navy in the near future. The following statement cannot fail, therefore, to be of interest to the naval experts of other powers. As to the type of vessel most fitted for Italy's navy, Rear Admiral Bettolo is of the opinion that warships, to be of practical utility, should not exceed a displacement of 8,000 tons, since, in consequence of the resistance offered by the new nickel steel armor, such vessels could offer the same amount of resistance combined with greater speed than is the case with the larger vessels constructed of recent years. The armament of such a vessel ought to consist of eight 203 mm. guns; of eight guns of 152 mm.; of twelve of 76 mm.; and of twelve of 47 mm.; and in addition, of six torpedo dischargers, of which two should be below the water-line. The speed must amount to at least from 22 to 23 knots an hour. At a speed of 10 knots an hour such a vessel would have a radius of action of between 9,000 and 10,000 knots, and that would be considerably in excess of what the ships of other navies could do in this direction. It will thus be seen that such a vessel corresponds with the model produced by Rear Admiral Bettolo in conjunction with the naval engineer Cuniberti. With regard to the composition of the fleet, Rear Admiral Bettolo insists that Italy, in view of its position in the Mediterranean, needs two classes of ships, namely, ships of the line and torpedo boat destroyers; and he considers that the latter are still more requisite for Italy than they even are for England and France. Owing to their small size, and their inability to carry much coal, the strategic advantages of torpedo boat destroyers are not great, and they are diminished in proportion as the destroyer has to put out further to sea. But, as it is not a question of immense distances in the seas that surround Italy, fast torpedo boat destroyers would be of no little importance for the Italian navy. In addition to the four torpedo boat destroyers ordered by the Italian government at the Schichau works for delivery soon, two others are now being built by Thornycroft and four by Pattison at Naples. These latter destroyers will, however, be constructed under the supervision of the Thornycroft firm. Rear Admiral Bettolo is also of opinion that steps must be taken to improve the condition of the older men-of-war in the Italian navy. To this end, for example, the fighting value of the battleships Italia and Lepanto will be increased by stowing coal to the thickness of five metres in those parts of the vessels which contain the engines. Experiments have shown that a layer of coal three metres in thickness offers the same resistance as an armoring of twenty centimetres; moreover, the strongest of the explosives at present in use lose a great deal of their effect among the coal. In place of the disproportionately heavy armament of these vessels, guns of a lighter type, and therefore more easily to be handled, must be introduced, while, by a modification of the engines, the speed will be raised to 18 knots an hour. This modification will consist in adding three compound high-pressure cylinders to the three cylinders already in use. Out of the more obsolete vessels, or such as are unable to steam at an adequate rate of speed, but which otherwise appear to be still fit for service, two squadrons for coast defense will be formed, and to them will be allotted such torpedo boats as may be fit no longer for service on the high seas. The thoroughness of Rear Admiral Bettolo's views is seen in the fact that he does not confine himself entirely to the inanimate part of the navy; he regards the seamanship qualities of the officers and crews as forming the most important factor in estimating the value of a navy. He considers that his highest task is that of animating the personnel, and raising its standard; and he has in view a project for forming a naval militia out of the time-expired sailors. Such a body of men would be of great service in time of war in maintaining public order, and in defending coast towns threatened or bombarded by the enemy.—The Engineer, London.

Vessel owners are already reserving quarters at the Cadillac hotel, Detroit, for the annual meeting of the Lake Carriers' Association, which opens on the 17th of next month. As yet the only name mentioned in connection with the presidency of the association is that of J. G. Keith, Chicago. Capt. Keith probably does not know of his name being used in this connection, and there is therefore no telling whether he would accept the office if it were offered to him, but there are several of the Cleveland owners who appreciate his labors during several years past in behalf of the organization, and who would be pleased to see him elected president. It is not probable that W. J. Conners will try to secure the Buffalo grain shoveling contract for another year. The vessel owners will not give the contract to any of the labor unions or their representatives, on account of the uncertainty that would attend dealings with these organizations, and as a guess, therefore, it may be said that the chances are in favor of James Kennedy getting the contract for 1900.

W. J. Conners of Buffalo, is more prominent than ever in shipping circles of the great lakes on account of the harbor grants which he has just secured at Montreal. A vessel owner who has been closely associated with him in this large undertaking says: "Conners would undoubtedly have staked half his wealth on carrying out his plans in this matter, especially after he was confronted with bitter opposition of a spiteful kind from his own city of Buffalo. He is vain in some matters, and made mistakes on this score in the Montreal negotiations, but he is a wonderful organizer and a constructor in the sense that nothing appears too big to him. If W. J. Conners had a military education, the quality of generalship that is in him would certainly have won him world fame."

Many marine men were in attendance at the celebration of the one hundredth anniversary of the founding of the museum of the East India Marine society at Salem, Mass. This interesting institution is filled with mementos of the mariners of a century ago.

The 1900 volume of the Record of American and Foreign Shipping, being the thirty-second annual issue of the publication, has just come from press. The new volume lists more than 17,000 vessels of all classes.

WRECKED ON THE NORTH SHORE OF LAKE SUPERIOR.

As might have been expected, the crew of the whaleback barge 115, wrecked on the north shore of Lake Superior, had a thrilling experience in that wilderness. A part of the story, as told by Mate M. J. Lynip, is as follows:

"It was about noon on Monday, Dec 18, when the barge, after floating around Lake Superior for five days, drifted ashore on what we afterwards found to be Pic island. Where the barge grounded the land is very bold and rises from the water's edge 500 or 600 feet and even higher in places. The barge began to pound heavily and we were afraid that she would knock a hole in herself. There was a little life raft on top of the after turret (our life boat had been carried away before we were separated from the steamer) and we used this to get ashore. First two of the men went ashore and made a landing, and then sent the raft back and forth until we were all ashore. The cook was just baking bread when we went ashore and we were unable to take this with us. The shore was a couple of hundred feet from the boat and quite a sea was running. Some of the men took extra clothes with them and in the party we had two loaves of bread and a ham, besides our pockets full of candles. There were some provisions left aboard the boat but we had no time to get these and could not have carried them if we had, as the snow was very deep on the land. We landed in a small cove and began to climb up the steep bluff. We caught hold of roots and stones and the small evergreen trees which grew among the rocks and at last reached the top. We thought at this time that we were ashore on the mainland. The snow was about three feet deep, but the weather was not as cold as on the water. The first night we camped in the woods and the next day we started along the shore line. It was then that we found that we were on an island. As we followed the shore we came across a log cabin about 3 o'clock in the afternoon. It was without a roof and had a part of an old sheet iron stove. We had taken ashore from the barge an axe and some matches and we all started to cut boughs and make a roof for the shanty and to make a fire in the stove. We stayed in the shanty Tuesday night, and it was here that the steward's feet were so badly frozen. Wednesday morning we could see the mainland, about three miles away. We ripped the old shanty down and made a raft with which to get ashore on the mainland. The raft was not large enough to hold all of the men, and sank knee deep in the water when we all boarded her, but we started out, and after drifting a couple of miles down the shore, making our trip about five miles in all, we landed. As soon as the raft struck the shore she went to pieces. There was lots of snow on the mainland, but we built a fire and camped in the bush all night. Thursday morning we started out and walked all day along the shore to the west. Our provisions were giving out, and we had about half a slice of wet bread and two ounces of raw ham each. That night we camped in the bush again, and Friday morning, after walking until 11 o'clock, and after struggling four days in search of human beings, we struck the tracks of the Canadian Pacific road. Here we ate the last of the provisions which we had with us. At last we met two section hands, who told us that the nearest town was Middletown, a mile and a half away. We reached the railroad station at Middletown about noon on Friday. The agent there did all he could for us, fed us, gave us a place to sleep, and dressed the steward's feet. The captain then wired to the company of our arrival. The Canadian Pacific people took good care of us."

WHEN GRANT CHRISTENED A STEAMER.

The following story is vouched for by a writer in the New York Commercial:

"It isn't generally known that Gen. U. S. Grant christened a steamship," remarked a gentleman connected with the Metropolitan Steamship Co., "but he did, and in a very modest way. It was the first iron steamship built by our company. The builders were Harlan & Hollingsworth of Wilmington, Del., and when the vessel was launched—in 1876, I think—Gen. Grant was present. There was no waste of champagne in the christening, and mighty little ceremony of any kind. One of the owners asked Grant to suggest a name for the vessel, and without a word he took the stub of a pencil from his pocket and penciled carefully on the stern of the ship the name 'General Whitney.' By that name the vessel was christened, and she still carries it. Gen. James S. Whitney was one of the best men that ever lived, and Grant liked him immensely. He was the father of William C. Whitney of New York and Henry M. Whitney of Boston. With Thomas Clyde of Philadelphia he organized the Metropolitan Steamship Co."

A PASSENGER AND FREIGHT STEAMER.

Work is progressing very rapidly at the yard of William McKie & Co. at East Boston, Mass., on the steamer City of Rockland, building for the Boston & Bangor Steamship Co. The new vessel, which will be ready for service in May, 1901, will be 285 feet in length, 38 feet beam and 14 feet depth of hold. In general appearance she will be very similar to the steamer City of Bangor, now plying between Boston and Bangor, with the exception that the awning deck, so called, will run back flush with the stern rail. The Rockland will be fitted with two electric light plants of 300 lights capacity each, and they will be run by an independent engine. In almost every other particular the steamer will be like the Bangor, and with the new boat the company will be as well equipped as any now doing business along the Atlantic coast.

MARINE REVIEW INDEX.

With next week's issue of the Marine Review will be issued an index for Volumes XIX and XX, running through the year 1899. This will enable subscribers who make a practice of binding the paper to make reference readily to any article printed throughout the year. Subscribers who would avoid the trouble of binding their papers may have the two volumes bound together, with or without the advertising pages, by sending the papers to us accompanied by \$3. The Review also has for sale for \$1 a very handsome and substantial ready binder which enables anyone to bind one volume of the paper with ease and convenience.

TRADE NOTES.

A very large order for safety hollow staybolts from one of the leading ship building concerns of the Pacific coast has just been received by the Falls Hollow Staybolt Co. of Cuyahoga Falls, O.

A second edition of the lecture by Walter B. Snow on "The Influence of Mechanical Draft Upon the Ultimate Efficiency of Steam Boilers" has just been issued by the B. F. Sturtevant Co. of Boston, Mass., by whom copies will be sent upon application.

"A Summer Girl" is the title of an attractive picture on a calendar just issued by the Ashton Valve Co. of 271 Franklin street, Boston, manufacturers of Ashton "Pop" safety valves, and it may be accepted as a foregone conclusion that every business man who is fortunate enough to secure a copy will make room for it above his desk, no matter how many other similar souvenirs he may possess.

W. J. Wickes, general manager of Wickes Bros. Co. of Saginaw, Mich., says in a letter to Cole & Kuhls, Brooklyn (N. Y.) manufacturers of elastic seam paint and seam composition: "All the seam composition paint that we have had from your concern we used on our own yacht Catherine. We used it principally on her decks, spars and rails and we found it to work very nicely. It was exactly what you represented."

The Standard Automatic Releasing Hook Co., 17 State street, New York city, has just issued a highly artistic calendar for 1900. It is ornamented with several stirring pictures, one of them a reproduction of a wash drawing which will be remembered by readers of the naval edition of the Review and which depicts in a most striking manner the launching of a ship's boat at sea.

The American Pegamoid Co., 339 Broadway, New York city, manufacturers of Pegamoid aluminum paint, have just issued a neat price list

giving quotations on quantities of this valuable article, which has the distinction of being the only paint that keeps its bright, frosted, silvery appearance under all conditions of weather and in all climates. It also withstands the highest degree of heat on steam pipes, radiators, etc. It makes what is claimed to be the most desirable finish on steel or wood and will not crack or peel.

Patrons of David Kahnweiler's Sons, 437 Pearl street, New York city, manufacturers of United States regulation cork life preservers, metallic life boats, etc., always anticipate with interest the receipt of the calendar which constitutes the season's greetings of the firm. The souvenir for 1900 will entail no disappointment; indeed nine persons out of ten will consider it the handsomest that has as yet been issued by these well-known manufacturers of life saving appliances. Prominently displayed is a very beautiful reproduction in tint of A. Morlon's painting "To the Rescue."

The recovered Spanish cruiser Reina Mercedes will probably be allowed to remain at the Norfolk (Va.) navy yard for some time to come. The navy department had made arrangements to convert this vessel into a receiving ship, but the medical officers who inspected her reported that all the woodwork inside the hull would have to be torn out, and inasmuch as this would entail an expense of fully \$100,000, the department concluded that she would prove entirely too expensive a luxury.

VALUE OF STOCKS—LEADING IRON AND STEEL INDUSTRIALS.

Quotations furnished by HERBERT WRIGHT & Co., Cleveland, date of Dec. 27, 1899.

NAME OF STOCK.	OPEN	HIGH	LOW	CLOSE
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American Steel & Wire, Pfd.....	88	89 1/4	88	89
Federal Steel.....	47 1/2	50 3/4	47 1/8	50 3/8
Federal Steel, Pfd.....	70 3/4	72 1/2	70 3/8	72 1/8
National Steel.....	39 3/4	41 1/2	39 1/2	41 1/2
National Steel, Pfd.....				
American Tin Plate.....	26 3/4	27 1/4	26 1/2	27 1/4
American Tin Plate, Pfd.....	77	78	77	78
American Steel Hoop.....	41	41 1/2	41	41
American Steel Hoop, Pfd.....				
Republic Iron & Steel.....	19 1/4	20	19 1/4	19 7/8
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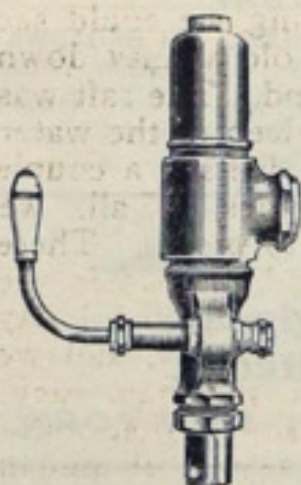
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AND
DIVERS
ABOARD
AT
ALL TIMES

1899		December							1899	
SUN.	MON.	TUE.	WED.	THU.	FRI.	SAT.	SUN.	MON.	TUE.	
..	..	..	..	..	1	2	3	4	5	
10	11	12	13	14	15	16	17	18	19	
24	25	26	27	28	29	30	31	..	..	

10-100 TON JACKS
1-12 INCH HAWSER
1-10
1-9

TELEGRAPH
PARKER & MILLEN,
DETROIT, MICH.

Capt. MARTIN SWAIN,
CHEBOYGAN, MICH.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., December 14, 1899. Sealed proposals for Construction of Breakwaters at Michigan City, Ind., will be received here until 3 P. M., January 13, 1900, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. Jan. 4.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., November 30, 1899. Sealed proposals for Pier Extension at Saint Joseph, Mich., will be received here until 3 P. M., December 30, 1899, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. Dec. 28.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., December 16, 1899. Sealed proposals for Pier Extension at Portage Lake, Mich., will be received here until 3 p. m., January 15, 1900, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. Jan. 11.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., December 18, 1899. Sealed proposals for Pier Extension at Grand Haven, Mich., will be received here until 3 p. m., January 17, 1900, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. Jan. 11.

U. S. Engineer Office, 57 Park St., Grand Rapids, Mich., December 20, 1899. Sealed proposals for Pier Extension at Muskegon, Mich., will be received here until 3 p. m., January 19, 1900, and then publicly opened. Information furnished on application. Chester Harding, Capt., Engrs. Jan. 11.

Engineer Office, U. S. Army, 185 Euclid Ave., Cleveland, O., December 12, 1899. Sealed proposals for removal of wreck of schooner "Onward" and cargo lying near shore on north side of Port Clinton Harbor, Ohio, will be received here until 2 p. m., standard time, January 12, 1900, and then publicly opened. Information on application. Jared A. Smith, Col., Engrs. Dec. 28 & Jan. 4.

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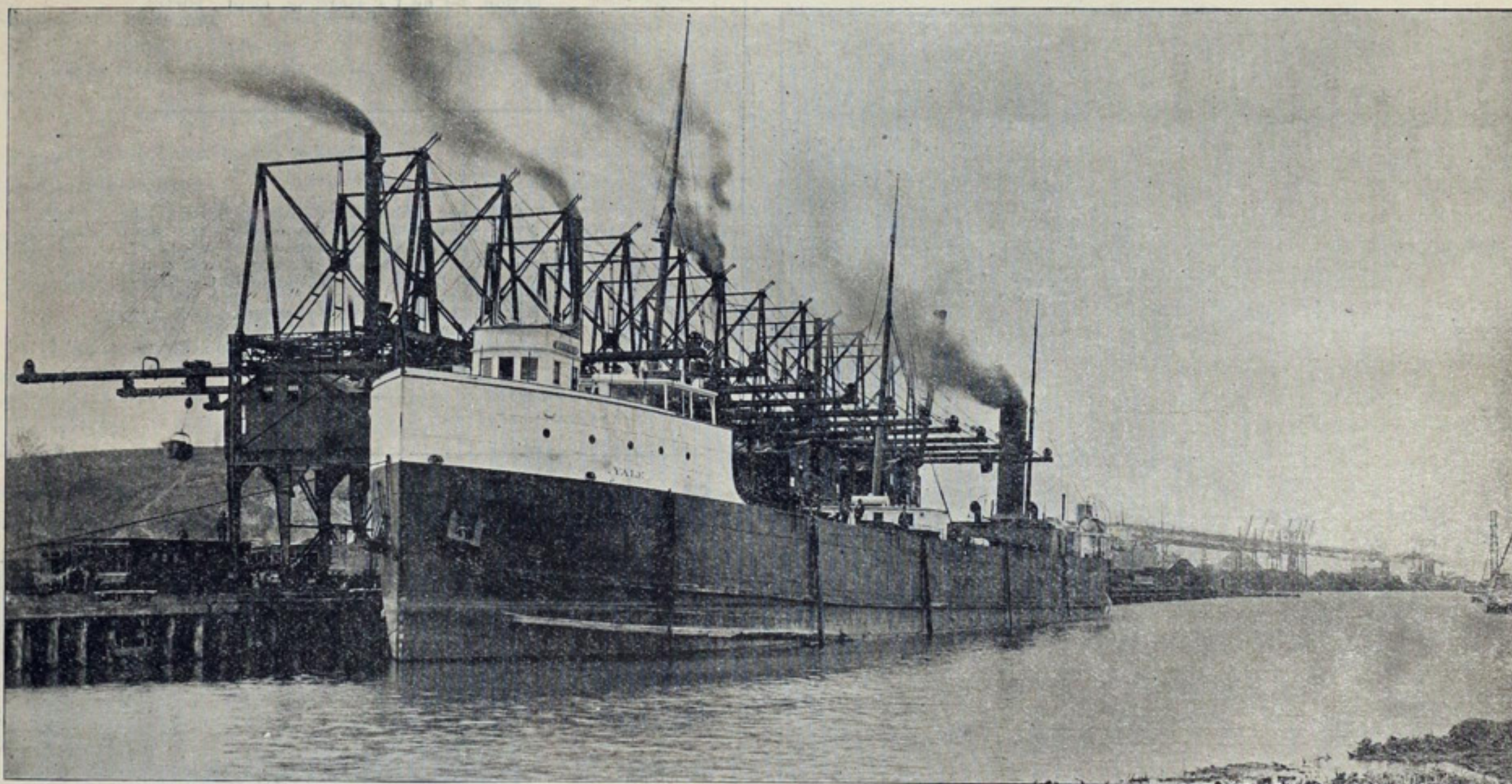
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